



Basic ESO Publication Statistics

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Introduction

What is the ESO Telescope Bibliography?

The ESO Telescope Bibliography (telbib) is a database of refereed papers published by the ESO users' community. All papers use partly or exclusively data from ESO telescopes.

Paper classification / selection criteria

Papers pertaining to the ESO Telescope Bibliography use partly or exclusively data from ESO facilities. These can be observations taken by the authors or data obtained from the ESO Science Archive or other sources, regardless of whether or not the observations have been published before. However, papers that merely quote results from the literature, that are derived from ESO data, are excluded. Likewise, papers that describe instrumentation or software, simply mention ongoing projects (e.g., surveys or Large Programmes), suggest future observations with ESO facilities, develop models or run simulations, using data merely as examples, are not included in telbib. Also excluded are papers which show ESO images as a visual reference rather than using them to achieve scientific results.

The ESO librarians communicate with authors as well as ESO instrument scientists and archive specialists to determine if, and which, observations were used in publications. The final decision about inclusion or exclusion of a given paper lies with the ESO Director for Science.

Coverage and Completeness

telbib contains records from publication year 1996 onwards. New records are added approx. 3 weeks after they appear with their final bibcode on the NASA ADS Abstract Service. The following journals are routinely screened: *A&A*, *A&ARv*, *AJ*, *AN*, *ApJ*, *ApJS*, *ARA&A*, *EM&P*, *Icarus*, *MNRAS*, *Nature*, *NewA*, *NewAR*, *PASJ*, *PASP*, *P&SS*, *Science*.

For VLT/VLTI and Chajnantor facilities, instrument-level information and program IDs are available since the beginning of operations. All papers based on data from La Silla facilities are tagged with telescope labels since 1996, but instrument labels and program IDs have only been assigned to papers from publishing year 2000 onwards. In addition, some instruments (e.g., FEROS@1.5 m telescope) may have been operated under special agreements for which no program IDs exist.

We make extensive efforts in order to identify all refereed papers that use ESO data (see also the telbib Help pages at <http://telbib.eso.org/help.html>) and consider telbib essentially complete.

Populating the Database

telbib is compiled by scanning the major astronomy journals for scientific papers that contain any of the ESO-defined keywords (e.g., telescope and instrument names). Bibliographic information, citations and some further metadata are imported from the NASA ADS Abstract Service. Standardized descriptions of telescopes and instruments, survey names and other tags as well as ESO program IDs are assigned by the librarians.

Access, Reports, Statistics

telbib's public interface is available at <http://telbib.eso.org>. While the public interface provides access to some publications that use data obtained during non-ESO time (such as APEX observations obtained during Max Planck, Onsala, or Chilean observing time), statistics reported in this document include only papers based on data from telescopes and instruments for which observing time is recommended by the ESO OPC (Observing Programmes Committee), unless explicitly mentioned otherwise.

Metrics derived from the database can be explored in various ways:

- search results are shown in tabular format. Whenever possible, entries include ESO program IDs that provide direct links to the data in ESO Archive. The results can be exported for further use
- search results can be visualized as animated charts which are created on-the-fly, based on the user's queries
- interactive graphs of selected statistics are available in the telbib Statistics area (<http://telbib.eso.org/telbibstats/>)
- an overview of publication statistics is available at http://telbib.eso.org/pubstats_overview.php. In order to make our statistics more transparent and reproducible, the numbers are linked to the corresponding records in the telbib database
- various metrics as well as instrument-level statistics derived from the database can be found in this document, "Basic ESO Statistics", which is available on the [ESO Libraries homepage](#) or directly at <http://www.eso.org/libraries/edocs/ESO/ESOstats.pdf>
- lists of papers included in the ESO telescope bibliography are available as Supplements to the ESO Annual Report (<http://www.eso.org/public/products/annualreports/>).

For more detailed reports, contact the ESO librarians (library@eso.org).

Publications

ESO publication statistics are derived from the Telescope Bibliography (telbib), a database of refereed articles that directly use ESO data. telbib is maintained by the ESO library. Here, we provide some basic statistics to give an overview of publications and citations for the publication years 1996-2021.

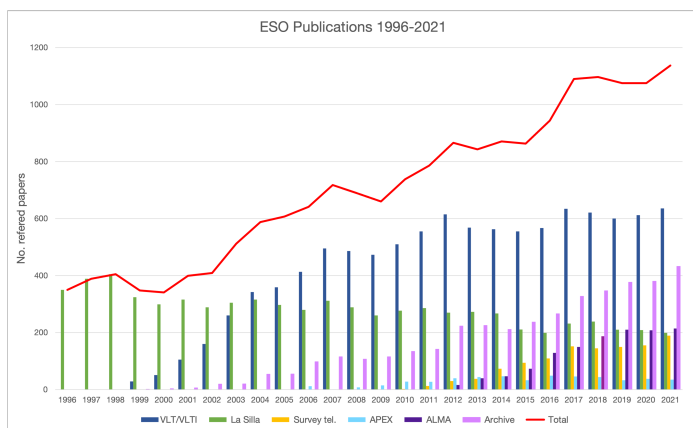


Fig. 1: Refereed papers using ESO data

Notes:

VLT/VLTI: papers using data generated by VLT and VLTI instruments, including visitor instruments for which observing time is recommended by the ESO OPC (Observing Programmes Committee), e.g., VLT Ultracam, VLTI PIONIER.

La Silla: papers using data generated by facilities located on La Silla, including visitor instruments for which observing time is recommended by the ESO OPC, e.g., NTT Ultracam. Papers based on data from non-ESO telescopes or observations obtained during 'private' periods are not included.

Survey telescopes: papers using data generated by ESO's survey telescopes VISTA and VST

APEX: papers using data generated by APEX, including visitor instruments for which observing time is recommended by the ESO OPC, e.g., APEX P-Artemis, APEX Z-Spec. Other visitor instruments (e.g., APEX/CONDOR) are excluded. Only papers based (entirely or partly) on ESO APEX time are included.

ALMA: papers using data generated by ALMA. Only papers based (entirely or partly) on European ALMA time are included.

Archive: papers using partly or exclusively archival data, i.e., observations without any overlap between observers and authors.

Papers can use data from more than one facility, therefore the total number cannot be calculated by simply adding all publications of the individual sites, telescopes, or instruments.

Publication and citation statistics mentioned in this report date from February 2022, unless indicated otherwise.

Table 1: Number of refereed papers using ESO data (see also <http://telbib.eso.org/pubstats/overview.php>)

| | VLT / VLTI | La Silla | Survey tel. | APEX | ALMA | Arc. | Total |
|------|------------|----------|-------------|------|------|------|-------|
| 1996 | | 350 | | | | | 350 |
| 1997 | | 389 | | | | | 389 |
| 1998 | | 405 | | | | | 405 |
| 1999 | 29 | 324 | | | | 1 | 348 |
| 2000 | 51 | 299 | | | | 3 | 341 |
| 2001 | 105 | 316 | | | | 6 | 399 |
| 2002 | 160 | 289 | | | | 19 | 409 |
| 2003 | 260 | 305 | | | | 20 | 512 |
| 2004 | 342 | 316 | | | | 54 | 588 |
| 2005 | 359 | 297 | | | | 55 | 607 |
| 2006 | 413 | 280 | | 12 | | 98 | 641 |
| 2007 | 495 | 312 | | 1 | | 115 | 718 |
| 2008 | 486 | 289 | | 8 | | 107 | 689 |
| 2009 | 473 | 260 | | 15 | | 115 | 660 |
| 2010 | 510 | 277 | 2 | 28 | | 134 | 738 |
| 2011 | 555 | 286 | 13 | 27 | | 142 | 786 |
| 2012 | 615 | 270 | 30 | 40 | 16 | 223 | 866 |
| 2013 | 568 | 273 | 38 | 44 | 40 | 225 | 843 |
| 2014 | 563 | 267 | 73 | 47 | 47 | 211 | 871 |
| 2015 | 555 | 211 | 94 | 33 | 73 | 237 | 863 |
| 2016 | 567 | 199 | 109 | 49 | 129 | 266 | 944 |
| 2017 | 634 | 232 | 152 | 46 | 150 | 327 | 1090 |
| 2018 | 621 | 239 | 145 | 44 | 187 | 347 | 1097 |
| 2019 | 600 | 210 | 150 | 33 | 210 | 377 | 1075 |
| 2020 | 612 | 209 | 155 | 38 | 208 | 380 | 1075 |
| 2021 | 636 | 199 | 189 | 35 | 214 | 432 | 1137 |

Citations

In bibliometric studies, numbers of publications show the observatory's productivity, citations the impact papers have made among the community. Since it takes time to gather citations, older papers typically have higher citation numbers than recent ones.

While it is tempting to use publication and citation statistics for comparisons, this has to be done with **utmost care** as the numbers may have been obtained with different methodologies.

| | Pubs | Cites | Average |
|------|------|-------|---------|
| 1996 | 350 | 18276 | 52,22 |
| 1997 | 389 | 19028 | 48,92 |
| 1998 | 405 | 37190 | 91,83 |
| 1999 | 348 | 30671 | 88,14 |
| 2000 | 341 | 19134 | 56,11 |
| 2001 | 399 | 22167 | 55,56 |
| 2002 | 409 | 25246 | 61,73 |
| 2003 | 512 | 38153 | 74,52 |
| 2004 | 588 | 46006 | 78,24 |
| 2005 | 607 | 37113 | 61,14 |
| 2006 | 641 | 46848 | 73,09 |
| 2007 | 718 | 46186 | 64,33 |
| 2008 | 689 | 41968 | 60,91 |
| 2009 | 660 | 46979 | 71,18 |
| 2010 | 738 | 46896 | 63,54 |
| 2011 | 786 | 43368 | 55,18 |
| 2012 | 866 | 44117 | 50,94 |
| 2013 | 843 | 47903 | 56,82 |
| 2014 | 871 | 42150 | 48,39 |
| 2015 | 863 | 39262 | 45,49 |
| 2016 | 944 | 39440 | 41,78 |
| 2017 | 1090 | 40894 | 37,52 |
| 2018 | 1097 | 36544 | 33,31 |
| 2019 | 1075 | 22430 | 20,87 |
| 2020 | 1075 | 13743 | 12,78 |
| 2021 | 1137 | 6155 | 5,41 |

Table 2: Total and average citations of refereed papers using ESO data

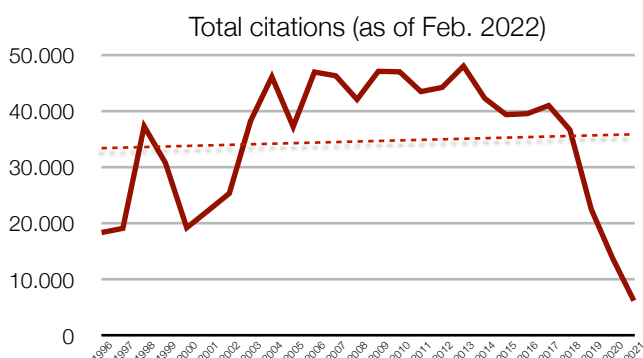


Fig. 2a: Total citations of papers using ESO data (with trend line)

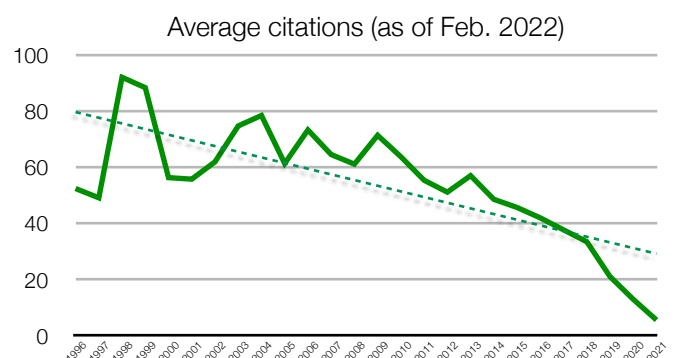


Fig. 2b: Average citations of papers using ESO data (with trend line)

ESO and other Observatories

In order to put ESO's research output into context, we give an overview of the total numbers of publications of major observatories for the publication years 1996 to 2021 (if already available). Note that some facilities date back further than that; their early years are not included in this graph.

The **most simplistic way** of comparing facilities is to look at the numbers of publications. Obviously, this favors large institutions with many facilities over smaller ones. **A more meaningful investigation should normalize the numbers** in some way, for instance by number of observing hours, by actual share of data used in the papers (as many scientific articles use data from more than one observatory), or by budget (telescope construction costs and maintenance).

When comparing publication statistics among different observatories, it is essential to assess the **selection criteria** applied by each observatory. To the best of our knowledge, the observatories shown in this graph include only papers that actually use observational data from their facilities (as opposed to merely referencing them). All papers were published in refereed journals.

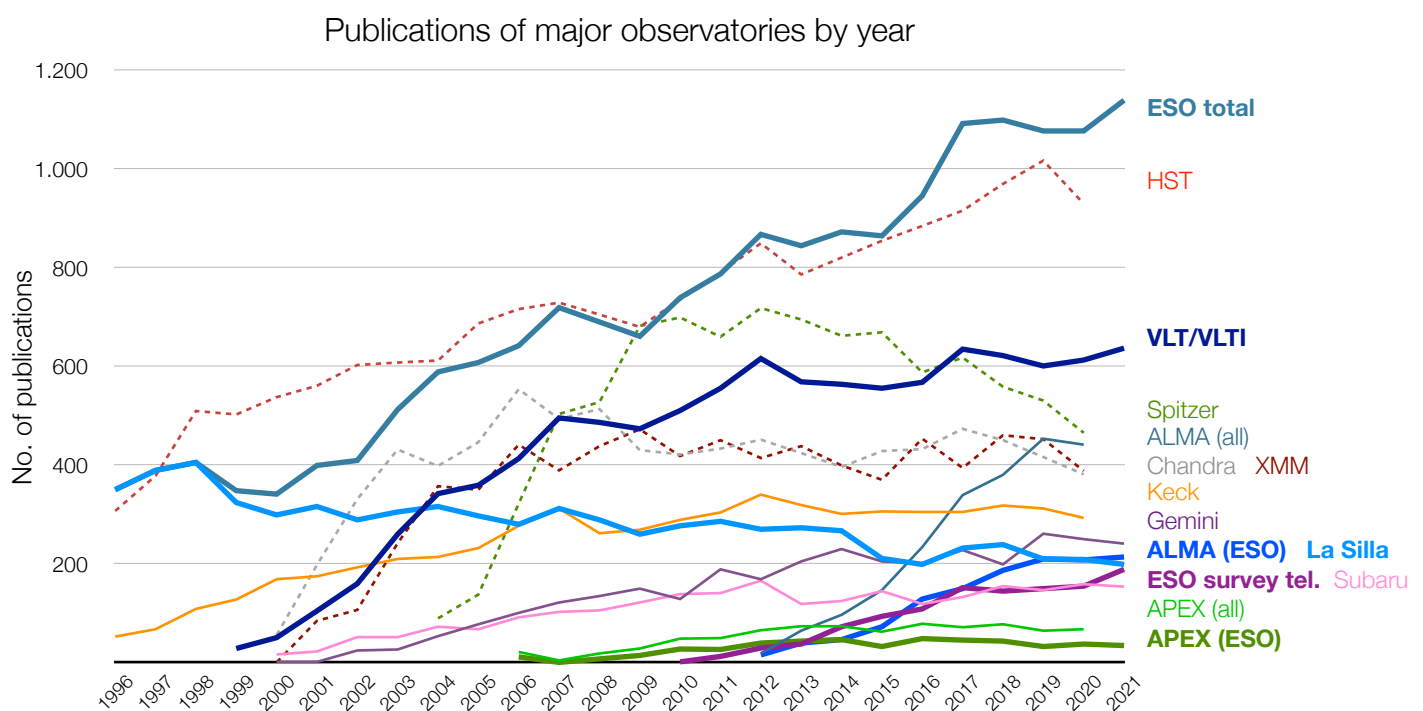


Fig. 3: Refereed publications by ESO and other observatories (mostly as of 02/2022; info for 2021 may still be preliminary.)

Thick lines: ESO facilities. **Thin lines:** other ground-based facilities. **Dashed lines:** space-based facilities.

Please note that selection criteria for inclusion or exclusion of papers vary among observatories.

The statistics shown in Fig. 3 and Table 3 were obtained as follows:

ESO total, VLT/VLTI, La Silla, ESO survey telescope, APEX (ESO and all partners), **ALMA** (Europe and all partners):

ESO Telescope Bibliography (<http://telbib.eso.org>)

Chandra: Chandra Bibliographic Statistics (<http://cxc.harvard.edu/cda/bibstats/bibstats.html>) 'Refereed Chandra Science Papers' and www.eso.org/http://cxc.harvard.edu/cda/bibstats/plots/Current/Papers_by-year.txt

Gemini: Gemini publications, (www.gemini.edu/science/publications/)

HST: HST Publication Statistics (<http://archive.stsci.edu/hst/bibliography/pubstat.html>)

Keck: Keck Science Bibliography (http://www2.keck.hawaii.edu/library/keck_papers.html)

Spitzer: Spitzer Bibliographical Database (<http://sohelp2.ipac.caltech.edu/bibsearch/>, Observational + Legacy Enhanced Data Products)

Subaru: Subaru Publishing Results (<https://subarutelescope.org/Observing/Proposals/Publish/index.html>)

XMM: XMM-Newton in the Journals (<http://heasarc.gsfc.nasa.gov/docs/xmm/xmmbib.html>). Number of publications per year provided by Norbert Schartel, ESA, Madrid, Spain

| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|-----------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ESO total | 348 | 341 | 399 | 409 | 512 | 588 | 607 | 641 | 718 | 689 | 660 | 738 | 786 | 866 | 843 | 871 | 863 | 944 | 1090 | 1097 | 1075 | 1075 | 1137 |
| VLT/VLTI | 29 | 51 | 105 | 160 | 260 | 342 | 359 | 413 | 495 | 486 | 473 | 510 | 555 | 615 | 568 | 563 | 555 | 567 | 634 | 621 | 600 | 612 | 636 |
| La Silla | 324 | 299 | 316 | 289 | 305 | 316 | 297 | 280 | 312 | 289 | 260 | 277 | 286 | 270 | 273 | 267 | 211 | 199 | 232 | 239 | 210 | 209 | 199 |
| ESO survey tel. | | | | | | | | | | | 2 | 13 | 30 | 38 | 73 | 94 | 109 | 152 | 145 | 150 | 155 | 189 | |
| APEX (ESO) | | | | | | | | 12 | 1 | 8 | 15 | 28 | 27 | 40 | 44 | 47 | 33 | 49 | 46 | 44 | 33 | 38 | 35 |
| ALMA (ESO) | | | | | | | | | | | | | | 16 | 40 | 47 | 73 | 129 | 150 | 187 | 210 | 208 | 214 |
| APEX (all) | | | | | | | | 22 | 5 | 19 | 29 | 49 | 50 | 66 | 74 | 74 | 63 | 79 | 72 | 78 | 65 | 68 | |
| ALMA (all) | | | | | | | | | | | | | | 19 | 65 | 97 | 147 | 234 | 339 | 380 | 453 | 441 | |
| Chandra | | 56 | 198 | 331 | 431 | 398 | 446 | 553 | 493 | 513 | 430 | 421 | 433 | 451 | 424 | 396 | 426 | 432 | 473 | 450 | 416 | 381 | |
| Gemini | | 2 | 2 | 25 | 27 | 54 | 78 | 101 | 122 | 135 | 150 | 129 | 189 | 169 | 205 | 230 | 205 | 201 | 228 | 199 | 261 | 250 | 241 |
| HST | 502 | 537 | 560 | 602 | 607 | 611 | 686 | 715 | 728 | 704 | 679 | 734 | 789 | 848 | 785 | 819 | 853 | 883 | 914 | 968 | 1015 | 928 | |
| Keck | 128 | 169 | 175 | 193 | 210 | 214 | 232 | 277 | 312 | 262 | 269 | 289 | 304 | 340 | 319 | 301 | 306 | 305 | 305 | 318 | 312 | 293 | |
| Spitzer | | | | | | 90 | 138 | 322 | 503 | 527 | 681 | 698 | 659 | 717 | 694 | 661 | 668 | 587 | 617 | 558 | 530 | 465 | |
| Subaru | | 17 | 23 | 52 | 52 | 73 | 68 | 92 | 103 | 106 | 122 | 139 | 141 | 166 | 119 | 125 | 145 | 119 | 133 | 155 | 147 | 159 | 154 |
| XMM | | 1 | 85 | 107 | 242 | 357 | 350 | 441 | 389 | 438 | 472 | 418 | 450 | 414 | 438 | 399 | 370 | 453 | 394 | 460 | 452 | 388 | |

Table 3: Number of refereed papers using data from ESO and other observatories. Pre-1999 statistics and links to the observatory statistics can be found via the links listed below Fig. 3

ESO Top 20

The ESO Top 20 list contains the 20 articles that gathered the highest number of citations. All papers directly use ESO data and were published in refereed journals.

The first two papers are the two highest quoted refereed papers listed on the ADS (see <http://tinyurl.com/lwb2tbc>)

| # | Bibcode | Citations | Title | Authors | Telescopes / Instruments |
|---|---------------------|-----------|---|---------------------------|--------------------------|
| 1 | 1998AJ....116.1009R | 13.700 | Observational Evidence from Supernovae for an Accelerating Universe and a Cosmological Constant | Riess et al. | EMMI/NTT, 3.6m, 1.5m |
| 2 | 1999ApJ...517..565P | 13.461 | Measurements of Omega and Lambda from 42 High-Redshift Supernovae | Perlmutter et al. | EFOSC2/3.6m |
| 3 | 2018A&A...616A...1G | 5.509 | Gaia Data Release 2. Summary of the contents and survey properties | Gaia Collaboration et al. | OMEGACAM |

(Contd. on next page)

(Contd. from previous page)

| # | Bibcode | Citations | Title | Authors | Telescopes / Instruments |
|----|----------------------|-----------|--|---------------------------|--|
| 4 | 2004ApJ...607..665R | 3.537 | Type Ia Supernova Discoveries at $z > 1$ from the Hubble Space Telescope: Evidence for Past Deceleration and Constraints on Dark Energy Evolution | Riess et al. | FORS2 |
| 5 | 2016A&A...595A...1G | 3.247 | The Gaia mission | Gaia Collaboration et al. | OMEGACAM |
| 6 | 2013Sci...340..448A | 2.310 | A Massive Pulsar in a Compact Relativistic Binary | Antoniadis et al. | FORS2 |
| 7 | 2006A&A...447...31A | 2.173 | The Supernova Legacy Survey: measurement of Ω_M , Ω_Λ and w from the first year data set | Astier et al. | FORS1 |
| 8 | 2017ApJ...848L..12A | 2.172 | Multi-messenger Observations of a Binary Neutron Star Merger | Abbott et al. | EFOSC2, FORS2, HAWK-I, MUSE, NACO, OMEGACAM, SOFI, VIMOS, VIRCAM, VISIR, X-SHOOTER |
| 9 | 1998Natur.391...51P | 2.062 | Discovery of a supernova explosion at half the age of the universe | Perlmutter et al. | EFOSC1/3.6m |
| 10 | 2003ApJ...594....1T | 1.619 | Cosmological Results from High- z Supernovae | Tonry et al. | FORS1, ISAAC |
| 11 | 1998Natur.395..670G | 1.598 | An unusual supernova in the error box of the γ -ray burst of 25 April 1998 | Galama et al. | EMMI/NTT |
| 12 | 2003ApJ...598..102K | 1.464 | New Constraints on Ω_M , Ω_Λ , and w from an Independent Set of 11 High-Redshift Supernovae Observed with the Hubble Space Telescope | Knop et al. | EFOSC2, FORS1 |
| 13 | 2004A&A...418..989N | 1.397 | The Geneva-Copenhagen survey of the Solar neighbourhood. Ages, metallicities, and kinematic properties of $\sim 14\,000$ F and G dwarfs | Nordstrom et al. | Danish1.5 |
| 14 | 2006ApJ...648L.109C | 1.384 | A Direct Empirical Proof of the Existence of Dark Matter | Clowe et al. | FORS1, WFI |
| 15 | 2004ApJ...600L..93G | 1.382 | The Great Observatories Origins Deep Survey: Initial Results from Optical and Near-Infrared Imaging | Giavalisco et al. | FORS1, FORS2, ISAAC, SOFI, WFI |
| 16 | 2008ApJ...686..749K | 1.365 | Improved Cosmological Constraints from New, Old, and Combined Supernova Data Sets | Kowalski et al. | Danish1.5, EFOSC2 |
| 17 | 2007ApJS...172....1S | 1.358 | The Cosmic Evolution Survey (COSMOS): Overview | Scoville et al. | VIMOS |
| 18 | 2014A&A...568A..22B | 1.296 | Improved cosmological constraints from a joint analysis of the SDSS-II and SNLS supernova samples | Betoule et al. | EMMI |
| 19 | 2010ApJ...721..193P | 1.296 | Mass and Environment as Drivers of Galaxy Evolution in SDSS and zCOSMOS and the Origin of the Schechter Function | Peng et al. | VIMOS |
| 20 | 2007ApJ...670..156D | 1.247 | Multiwavelength Study of Massive Galaxies at $z \sim 2$. I. Star Formation and Galaxy Growth | Daddi et al. | FORS2, ISAAC |

Table 4: ESO Top 20 papers (as of Feb. 2022)

VLT instruments

VLT papers use data generated by VLT instruments. Visitor instruments for which observing time is recommended by the ESO OPC (Observing Programmes Committee), e.g., VLT Ultracam, are included in the general VLT statistics (see page 3), but are not shown in Fig. 4. Instrument-level data for the VLT are available since the beginning of operations, i.e., from publication year 1999 onwards.

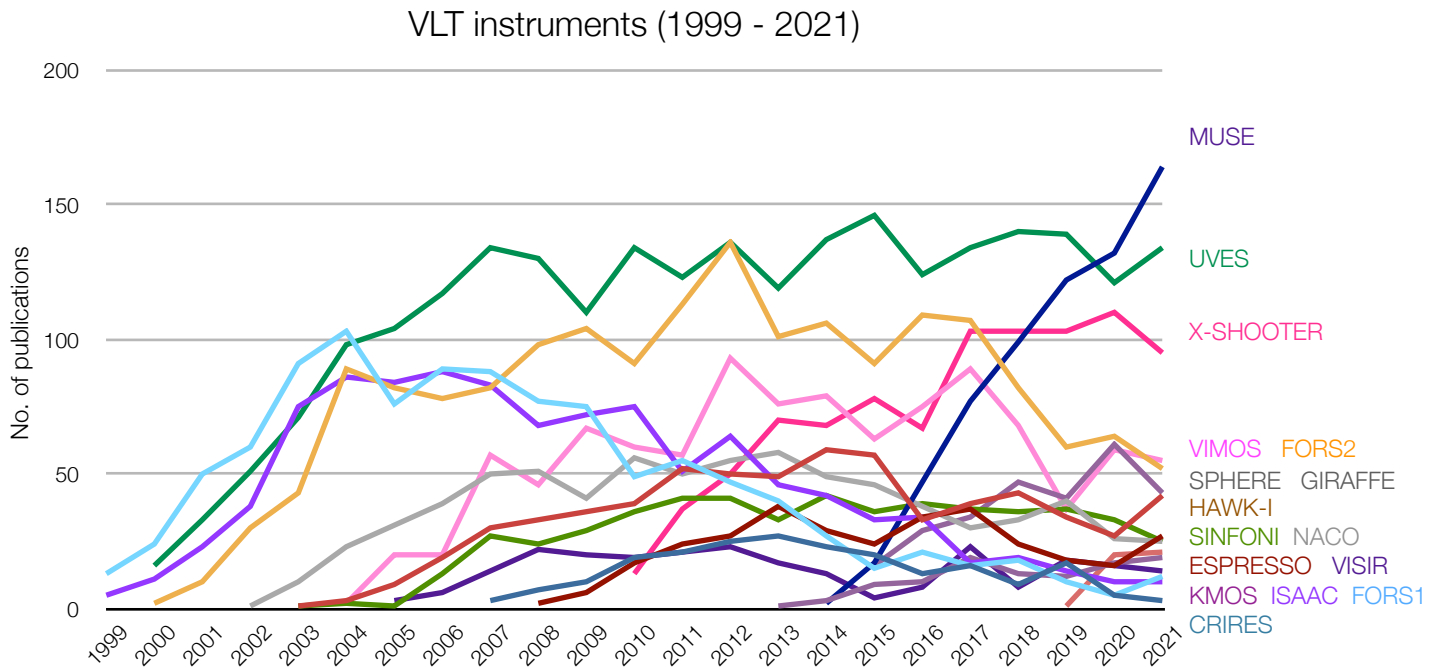


Fig. 4: Refereed publications using data from VLT instruments

FLAMES papers are listed as GIRAFFE and/or UVES. NACO = NAOS + CONICA. SINFONI = SPIFFI + MACAO

| | VLT | | | | | | | | | | | | | | | |
|------|--------|----------|-------|-------|---------|--------|-------|------|------|------|---------|--------|------|-------|-------|-----------|
| | CRIRES | ESPRESSO | FORS1 | FORS2 | GIRAFFE | HAWK-I | ISAAC | KMOS | MUSE | NACO | SINFONI | SPHERE | UVES | VIMOS | VISIR | X-SHOOTER |
| 1999 | | | 13 | | | | 5 | | | | | | | | | |
| 2000 | | | 24 | 2 | | | 11 | | | | | | 16 | | | |
| 2001 | | | 50 | 10 | | | 23 | | | | | | 33 | | | |
| 2002 | | | 60 | 30 | | | 38 | | | 1 | | | 51 | | | |
| 2003 | | | 91 | 43 | 1 | | 75 | | | 10 | 1 | | 71 | | | |
| 2004 | | | 103 | 89 | 3 | | 86 | | | 23 | 2 | | 98 | 2 | | |
| 2005 | | | 76 | 82 | 9 | | 84 | | | 31 | 1 | | 104 | 20 | 3 | |
| 2006 | | | 89 | 78 | 19 | | 88 | | | 39 | 13 | | 117 | 20 | 6 | |
| 2007 | 3 | | 88 | 82 | 30 | | 83 | | | 50 | 27 | | 134 | 57 | 14 | |
| 2008 | 7 | | 77 | 98 | 33 | 2 | 68 | | | 51 | 24 | | 130 | 46 | 22 | |
| 2009 | 10 | | 75 | 104 | 36 | 6 | 72 | | | 41 | 29 | | 110 | 67 | 20 | |
| 2010 | 19 | | 49 | 91 | 39 | 17 | 75 | | | 56 | 36 | | 134 | 60 | 19 | 13 |
| 2011 | 21 | | 55 | 113 | 52 | 24 | 51 | | | 50 | 41 | | 123 | 57 | 21 | 37 |
| 2012 | 25 | | 47 | 136 | 50 | 27 | 64 | | | 55 | 41 | | 136 | 93 | 23 | 50 |
| 2013 | 27 | | 40 | 101 | 49 | 38 | 46 | 1 | | 58 | 33 | | 119 | 76 | 17 | 70 |
| 2014 | 23 | | 27 | 106 | 59 | 29 | 42 | 3 | 2 | 49 | 42 | | 137 | 79 | 13 | 68 |
| 2015 | 20 | | 15 | 91 | 57 | 24 | 33 | 9 | 17 | 46 | 36 | 16 | 146 | 63 | 4 | 78 |
| 2016 | 13 | | 21 | 109 | 33 | 34 | 34 | 10 | 47 | 38 | 39 | 29 | 124 | 75 | 8 | 67 |
| 2017 | 16 | | 16 | 107 | 39 | 37 | 17 | 19 | 77 | 30 | 37 | 34 | 134 | 89 | 23 | 103 |
| 2018 | 9 | | 18 | 82 | 43 | 24 | 19 | 13 | 99 | 33 | 36 | 47 | 140 | 68 | 8 | 103 |
| 2019 | 17 | 1 | 10 | 60 | 34 | 18 | 14 | 12 | 122 | 40 | 37 | 41 | 139 | 37 | 18 | 103 |
| 2020 | 5 | 20 | 5 | 64 | 27 | 16 | 10 | 17 | 132 | 26 | 33 | 61 | 121 | 59 | 16 | 110 |
| 2021 | 3 | 21 | 12 | 52 | 42 | 27 | 10 | 19 | 164 | 25 | 25 | 43 | 134 | 55 | 14 | 95 |

Table 5: Number of refereed papers using VLT data

VLT instruments

VLT papers use data generated by VLT instruments, including visitor instruments for which observing time is recommended by the ESO OPC (Observing Programmes Committee), e.g. VLT PIONIER. Instrument-level data for the VLT are available since the beginning of operations, i.e., from publication year 2002 onwards.

| VLT | | | | | | |
|------|-------|---------|---------|------|---------|-------|
| | AMBER | GRAVITY | MATISSE | MIDI | PIONIER | VINCI |
| 2002 | | | | | | 1 |
| 2003 | | | | | | 6 |
| 2004 | | | | 3 | | 12 |
| 2005 | | | | 5 | | 12 |
| 2006 | 1 | | | 11 | | 6 |
| 2007 | 9 | | | 19 | | 4 |
| 2008 | 12 | | | 11 | | 1 |
| 2009 | 12 | | | 18 | 1 | 4 |
| 2010 | 12 | | | 6 | 0 | 1 |
| 2011 | 16 | | | 13 | 4 | 1 |
| 2012 | 18 | | | 8 | 2 | 1 |
| 2013 | 20 | | | 20 | 3 | 0 |
| 2014 | 15 | | | 12 | 13 | 1 |
| 2015 | 11 | | | 10 | 4 | 0 |
| 2016 | 13 | | | 7 | 11 | 0 |
| 2017 | 10 | 7 | | 5 | 15 | 1 |
| 2018 | 7 | 9 | | 6 | 10 | 0 |
| 2019 | 7 | 8 | 1 | 6 | 12 | 0 |
| 2020 | 7 | 22 | 1 | 3 | 9 | 0 |
| 2021 | 4 | 23 | 6 | 3 | 10 | 0 |

Table 6: Number of refereed publications using data from VLT instruments

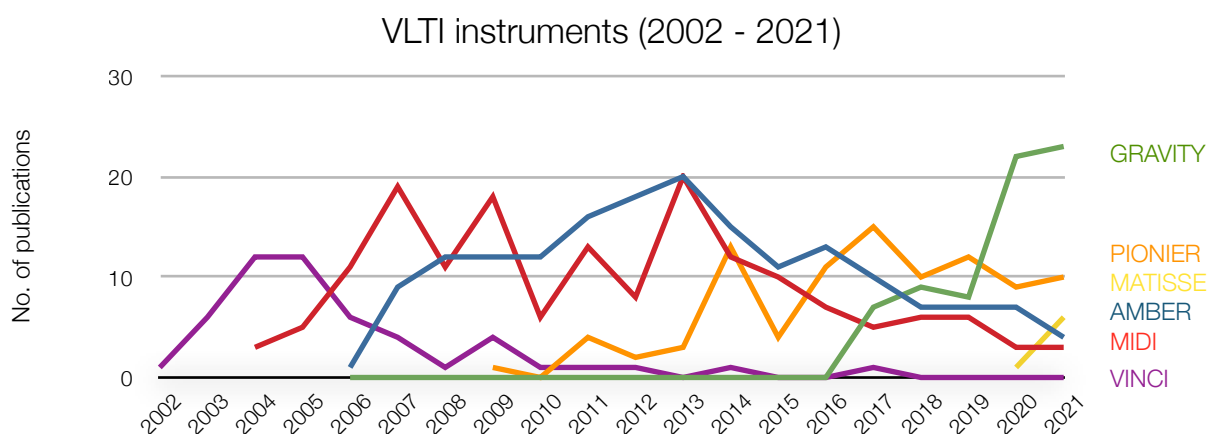


Fig. 5: Refereed publications using data from VLT instruments

Survey telescopes: VISTA + VST

ESO's Visible and Infrared Survey Telescope for Astronomy (VISTA), with its VIRCAM camera, has produced science papers since 2010. Papers mostly use data from the VV, VIKING, VMC, UltraVISTA, VHS, and VIDEO surveys. Observations with OmegaCAM at the VLT Survey Telescope (VST) led to the first data papers in 2014.

| | VISTA (VIRCAM) | VST (OmegaCAM) |
|------|-------------------|-------------------|
| 2010 | 2 | |
| 2011 | 13 | |
| 2012 | 30 | |
| 2013 | 38 | |
| 2014 | 65 | 8 |
| 2015 | 72 | 24 |
| 2016 | 94 | 19 |
| 2017 | 102 | 55 |
| 2018 | 107 | 49 |
| 2019 | 101 | 58 |
| 2020 | 116 | 61 |
| 2021 | 146 | 71 |

Table 7: Number of refereed publications using data from the VISTA and VST telescopes

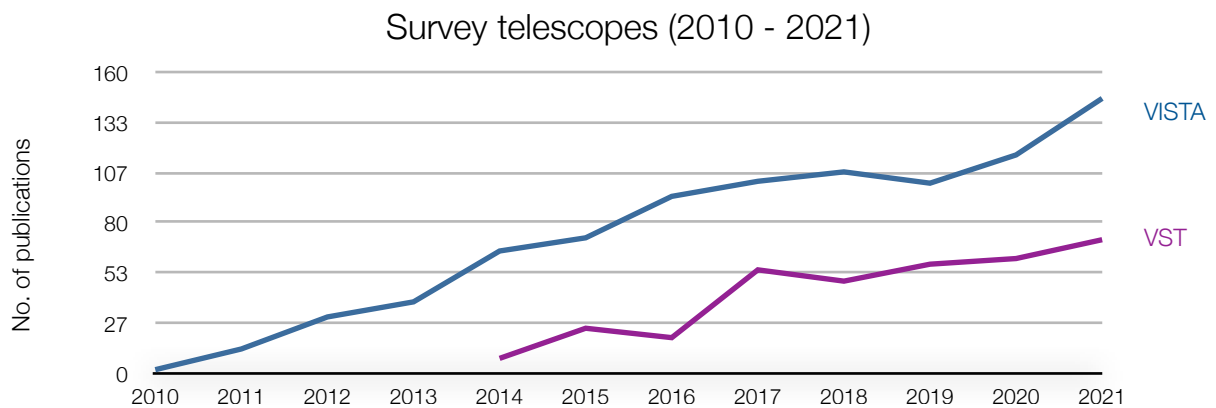
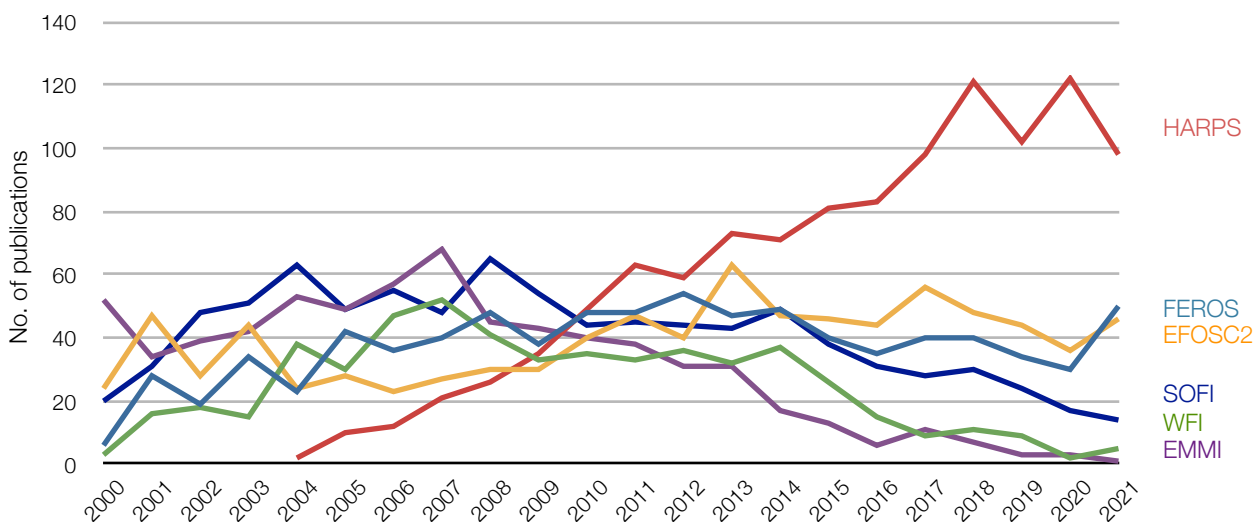


Fig. 6: Refereed publications using data from the survey telescopes

La Silla instruments

This section reports on papers that use data generated by other facilities of the La Silla Paranal (LSP) Observatory, located on La Silla. Papers based on data from non-ESO telescopes or observations obtained during reserved periods (e.g., national allocations of time) are not included. Instrument-level data for La Silla facilities are shown below from publication year 2000 onwards. Only papers based on data from FEROS (1.5m and 2.2m tel. combined), WFI (2.2m) EFOSC2 (2.2m, 3.6m, NTT combined), HARPS (3.6m), EMMI, and SOFI (both NTT) are included in the graph. The table also shows papers based on data from smaller or decommissioned La Silla facilities (e.g., TIMMI2, SUSI2) if observations took place during ESO time. Visitor instruments for which observing time is recommended by the OPC (e.g., NTT Ultracam) are included in the general statistics (see p. 3), but are not shown in Fig. 7.

La Silla instruments (2000 - 2021)



EFOSC2 = EFOSC2@NTT, EFOSC2@3.6m + EFOSC2@2.2m

FEROS = FEROS@1.5m + FEROS@2.2m

La Silla decomm. = small or decommissioned facilities.

National telescopes (e.a.. Swiss Euler Tel.) are **excluded**

Fig 7 (above) and Table 8 (below): Number of refereed papers using data from La Silla facilities

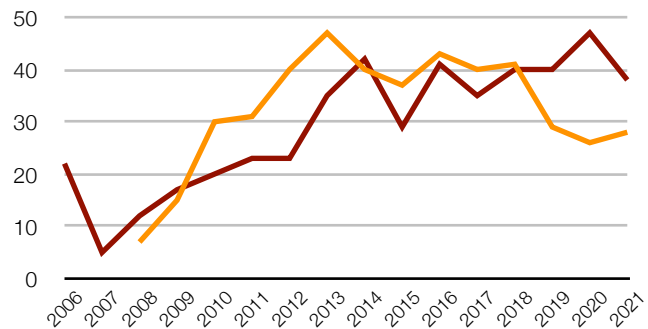
| | 2.2m | | 3.6m | NTT | | | La Silla decomm. |
|------|-------|-----|-------|--------|------|------|------------------|
| | FEROS | WFI | HARPS | EFOSC2 | EMMI | SOFI | |
| 2000 | 6 | 3 | 0 | 24 | 52 | 20 | 237 |
| 2001 | 28 | 16 | 0 | 47 | 34 | 31 | 215 |
| 2002 | 19 | 18 | 0 | 28 | 39 | 48 | 178 |
| 2003 | 34 | 15 | 0 | 44 | 42 | 51 | 169 |
| 2004 | 23 | 38 | 2 | 24 | 53 | 63 | 175 |
| 2005 | 42 | 30 | 10 | 28 | 49 | 49 | 135 |
| 2006 | 36 | 47 | 12 | 23 | 57 | 55 | 91 |
| 2007 | 40 | 52 | 21 | 27 | 68 | 48 | 97 |
| 2008 | 48 | 41 | 26 | 30 | 45 | 65 | 80 |
| 2009 | 38 | 33 | 35 | 30 | 43 | 54 | 68 |
| 2010 | 48 | 35 | 49 | 40 | 40 | 44 | 55 |
| 2011 | 48 | 33 | 63 | 47 | 38 | 45 | 47 |
| 2012 | 54 | 36 | 59 | 40 | 31 | 44 | 34 |
| 2013 | 47 | 32 | 73 | 63 | 31 | 43 | 37 |
| 2014 | 49 | 37 | 71 | 47 | 17 | 49 | 35 |
| 2015 | 40 | 26 | 81 | 46 | 13 | 38 | 17 |
| 2016 | 35 | 15 | 83 | 44 | 6 | 31 | 20 |
| 2017 | 40 | 9 | 98 | 56 | 11 | 28 | 20 |
| 2018 | 40 | 11 | 121 | 48 | 7 | 30 | 8 |
| 2019 | 34 | 9 | 102 | 44 | 3 | 24 | 19 |
| 2020 | 30 | 2 | 122 | 36 | 3 | 17 | 15 |
| 2021 | 50 | 5 | 98 | 46 | 1 | 14 | 14 |

APEX

APEX is a collaboration between the Max-Planck-Institute for Radio Astronomy (MPIfR, 55%), the Onsala Space Observatory (OSO, 13%), and ESO (32%). The telescope is located on the Chajnantor plateau in Chile's Atacama region and is operated by ESO.

Publication information for APEX is available since the beginning of operations, i.e., from publication year 2006 onwards. Papers based on data from all APEX partners are recorded in the ESO Telescope Bibliography (telbib), but only those that use ESO/APEX data are counted in the ESO statistics.

| APEX | | |
|-------|----------|----------|
| | ESO/APEX | all APEX |
| 2006 | 12 | 22 |
| 2007 | 1 | 5 |
| 2008 | 8 | 19 |
| 2009 | 15 | 29 |
| 2010 | 28 | 49 |
| 2011 | 27 | 50 |
| 2012 | 40 | 66 |
| 2013 | 44 | 74 |
| 2014 | 47 | 74 |
| 2015 | 33 | 63 |
| 2016 | 49 | 79 |
| 2017 | 46 | 72 |
| 2018 | 44 | 78 |
| 2019 | 33 | 65 |
| 2020 | 38 | 68 |
| 2021 | 35 | 61 |
| Total | 500 | 874 |



Imagers: APEX-SZ, Artemis, LABOCA, P-Artemis, SABOCA, SUPERCAM
Spectrographs: APEX-2A, CHAMP+, CONDOR, FLASH, LAsMA, MPL_1.1THz, nFLASH, PI230, SEPIA, SHFI, ZEUS-2, Z-Spec

Fig. 8: Number of refereed publications using APEX bolometer and heterodyne instruments, respectively. Data are from observations by **all APEX partners**. Note that the sum of papers from imagers and spectrographs can be higher than the real total since papers can use data from both groups.

Table 9: Number of refereed publications using ESO/APEX data and data generated by all APEX partners, respectively.

APEX publications (2006 - 2021)

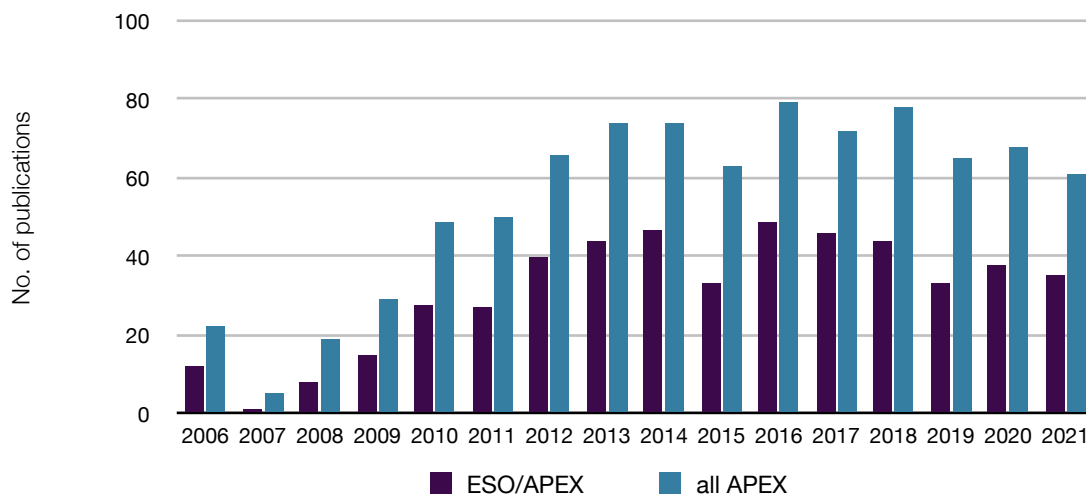


Fig. 9: Refereed publications using ESO/APEX data. For comparison, all APEX papers are shown.

ALMA

ALMA, the Atacama Large Millimeter/submillimeter Array, is an international collaboration between Europe, East Asia, and North America in cooperation with the Republic of Chile. The European executive is represented by ESO, which also hosts the European ALMA Regional Centre. The other partners North America and East Asia are represented by NRAO and NAOJ, respectively. The ALMA telescope bibliography is maintained by the librarians at ESO and NRAO as well as by NAOJ.

Papers based on European observing time as well as on data from all ALMA partners are recorded in the ESO Telescope Bibliography (telbib), but only those that use ESO/ALMA data are counted in the ESO statistics. Both numbers are shown below for comparison.

Papers resulting from science verification data are attributed to the four ALMA partners JAO, ESO, North America, and East Asia.

| ALMA | | |
|-------|----------|----------|
| | ESO/ALMA | all ALMA |
| 2012 | 16 | 19 |
| 2013 | 40 | 65 |
| 2014 | 47 | 97 |
| 2015 | 73 | 147 |
| 2016 | 129 | 232 |
| 2017 | 150 | 337 |
| 2018 | 187 | 380 |
| 2019 | 210 | 448 |
| 2020 | 208 | 439 |
| 2021 | 214 | 480 |
| Total | 1.274 | 2.644 |

Table 10: Number of refereed publications using ESO/ALMA data and data generated by all ALMA partners per year, respectively.

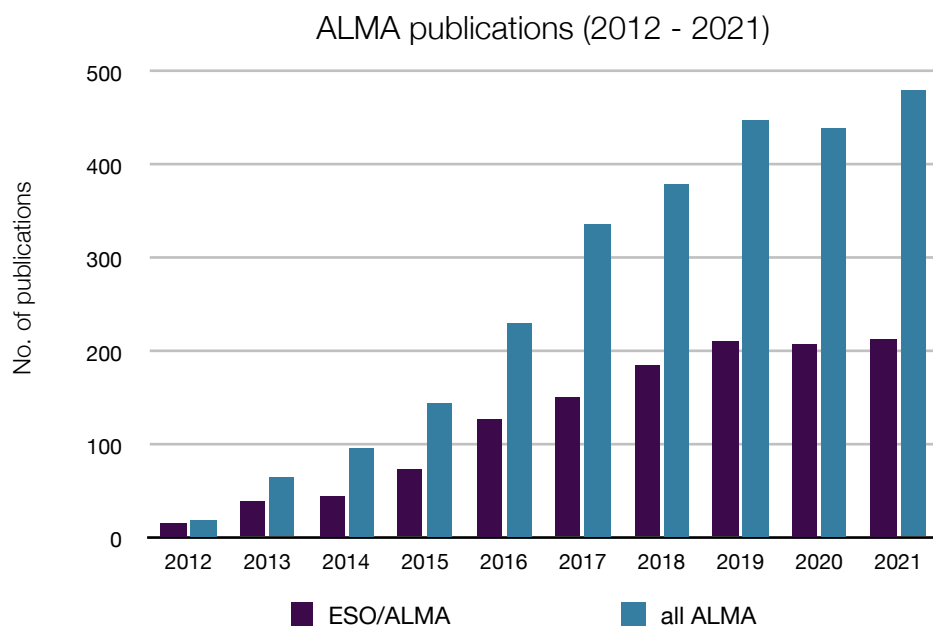


Fig. 10: Refereed publications using ESO/ALMA data. For comparison, all ALMA papers are shown. The graph is **not cumulative**.

Further Information

Articles and Presentations

For articles and presentations related to the ESO Telescope Bibliography, see http://www.eso.org/sci/libraries/useful_links/publications.html

Further telbib-related links:

Search: [ESO Telescope Bibliography \(telbib\)](#)

Cite: [ESO data citation policy](#)

Understand: [telbib Methodology](#)

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