



OPEN ACCESS IN ASTRONOMY

PRL ka Amrut Vyakhyaan Colloquium

— March 2022 —

भौतिक अनुसंधान प्रयोगशाला



Physical Research Laboratory

Uta Grothkopf

Library, Documentation, and Information Services department
European Southern Observatory (ESO)

Congratulations, PRL !



and

Thank you

especially to Prof. Dr. Nandita Srivastava,
Dr. Bhushit Vaishnav and Dr. Lokesh Sahu



Background — Work culture in astronomy



Open Access (OA) — What and Why?



Institutional View — Flavours of OA Publishing



Researchers' View — OA considerations for authors



The Larger View — OA in context



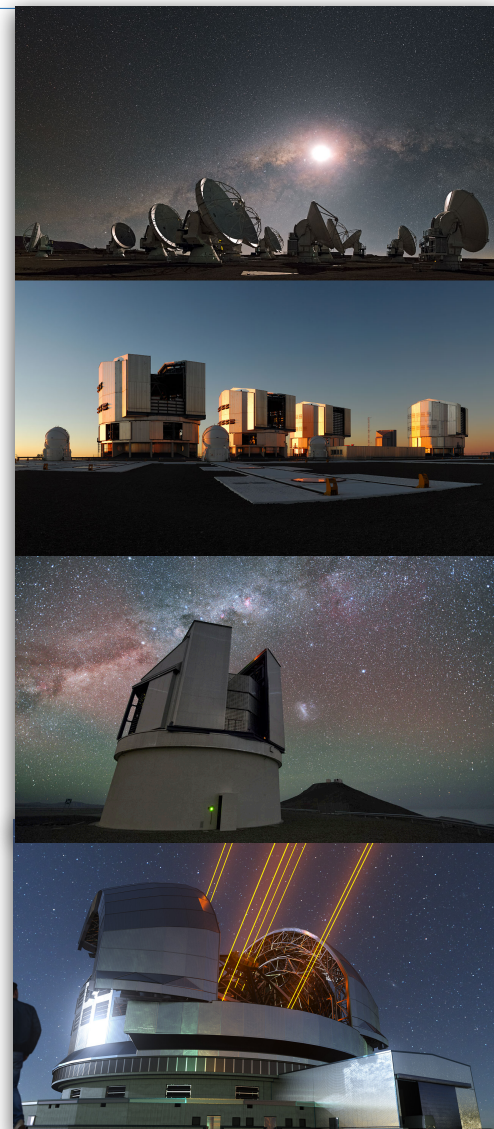
BACKGROUND: ESO

European Southern Observatory (ESO)

- Inter-governmental organization; 16 Member States + Chile
- Design, construct, operate state-of-the-art ground-based telescopes to enable front-line research in astronomy
- Headquarters near Munich, Germany, telescopes in Chile

Facilities

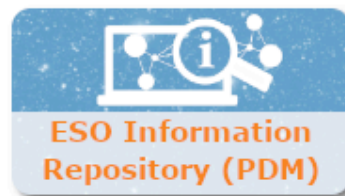
- VLT (Very Large Telescope)
- VISTA / VST Survey Telescopes
- ALMA (collaboration with North America, East Asia)
- ELT (Extremely Large Telescope)



Library, Documentation, and Information Services department

- Central information and documentation unit
- Productivity measures (Telescope Bibliography database, telbib.eso.org)
- Developments in scholarly communication, e.g., identifiers (DOI, ORCID), Open Access / Open Science

www.eso.org/libraries



WORK CULTURE IN ASTRONOMY



Observatories typically in **remote places**



Historically often **“solo librarians”**



Community (researchers and librarians)
closely connected



Tradition of **sharing and exchange**
(papers, data, code...)

CORE JOURNALS



Four journals > 35% of refereed astronomy literature



Governed by **Learned Societies**, published by commercial publishers

- American Astronomical Society (AAS) / IOP Publishing
- Royal Astronomical Society (RAS) / Oxford Univ. Press
- European Southern Observatory (ESO) / EDP Sciences

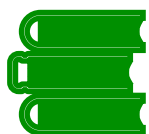


Community of researchers strongly influences publishing developments

READ ACCESS



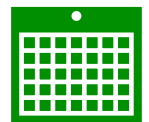
Wide-spread use of **Green OA** (arXiv/astro-ph)



Core journals digitised and **freely available** back to vol. 1



Publishers provide **temporary access** to selected recent articles



Access to core journal content often **one year** after publication



OPEN ACCESS - WHAT AND WHY?

Definition

Open Access is the **free, immediate, online availability** of research articles coupled with the **rights to use** these articles fully in the digital environment.

SPARC

(the Scholarly Publishing and Academic Resources Coalition)

<https://sparcopen.org/open-access/>



Typically: Publisher

Motivations

Make publicly funded research available to all: **knowledge exchange**

Reduce expenditure for journal subscriptions: **cost transparency**

BENEFITS OF OPEN ACCESS



CC-BY Danny Kingsley & Sarah Brown

Diagram from https://commons.wikimedia.org/wiki/File:Benefitsofopenaccess_cc-by_logo.pd_eng.jpg, D. Kingsley & S. Brown, CC-BY 4.0

BENEFITS OF OPEN ACCESS (CONTD.)



<https://en.unesco.org/covid19/communicationinformationresponse/opensolutions>

Early adopters, OA advocates

- Researchers (Peter Suber (Harvard); Paul Ginsparg, arXiv)
- Organisations (e.g., CERN)
- Librarians & their institutions

Funders

- Since 2018: Plan S (c**OA**lition S)
- Consortium led by European Commission (EC) and European Research Council (ERC)
- National, international, charitable funders, e.g., Wellcome and Bill & Melinda Gates Foundation
- Plan S - solution, shock, shift....
- Mandatory OA: *“Making full and immediate Open Access a reality”*



PLAN S PRINCIPLES

https://www.coalition-s.org/plan_s_principles/



01 CC-BY

02 Quality of OA

03 Incentives for OA

04 OA Funds

05 Capped fees

06 Aligned policies

07 All scholarly publications

08 Open archives and repositories

09 No hybrid

10 Monitor compliance, sanction non-compliance

01 CC-BY

- Authors retain copyright of their publications
- Open license mandatory, preferably Creative Commons Attribution License (CC-BY)



arXiv/astro-ph: typically non-exclusive right to distribute articles, not CC-BY

02 Quality of OA

- Funders will ensure jointly establishment of robust quality criteria
- cOAlition S will work with Directory of Open Access Journals (DOAJ) and the Directory of Open Access Repositories (OpenDOAR) to identify compliant journals + repositories

Attempt to avoid predatory / deceptive journals

03 Incentives for OA

- Funding of high-quality OA journals/platforms, if not yet existing
- Provide incentives to establish and support them

New journals (no reputation yet) —> new evaluation system?

Article-level metrics will become more important.

Career merit for authors / referees of OA journals?



09 No hybrid

- “Hybrid” publishing model is not compliant with Plan S

Prevents subscription-based journals from charging authors for OA in addition (“double dipping”)

Criticism of Plan S

- Many publishers concerned
- Needs of **society publishers** overlooked?
- Some scientists fear **restriction of academic freedom**
- **Implementation** unclear
- (Non-binding) implementation started 2021, more widely 2022

THE PATH TOWARDS OA

Some thoughts from key players



Publishers:

Flip to OA must be long-lasting (**sustainable**) with reliable partners



Readers:

Prefer access to as many articles as possible (**multi-disciplinary research**)



Authors:

Want the move to OA to be seamless and **non-disruptive** (“Diamond OA”)



Libraries:

Cannot afford rising subscription (or APC) costs

Support **collaborative, equitable OA**

FROM “READERS PAY” TO “AUTHORS PAY”

APCs (Article Processing Charges)

Gold OA

- Typically high costs; not equitable. Any savings?
- Process disruptive for authors
- Institutional publishing budget?
- New infrastructure needed: how to distribute available funds? (ethical questions)

Authors: \$\$\$

Overlay Journals

Gold OA

- Existing eprint infrastructure (e.g., arXiv) plus refereeing system
- Initiatives run by volunteers (researchers), based on grants (foundations)
- Publishing costs: depend on journal/model
- Sustainable?
- Danger of losing publishers’ expertise?
- Example: *The Open Journal of Astrophysics* (<https://astro.theoj.org/>)

Authors: if any, low (\$)

Transformative Agreements

- Publish-and-Read (PAR) / Read-and-Publish (RAP)
- Agreements between research org./consortia/countries + publishers
- Costs based on subscription price + number of papers per institute
- Typically provide access to publisher's open and closed content + OA publishing
- Allocated publishing budget often capped; further costs once used?
(German "DEAL" consortium: *Nature* EUR 9,500/article = approx. INR 800,000)
- How about small organizations / libraries w/o need for entire portfolio?
- Max. 3 years, then what?
- Results in yet another dependency! ("Big Deal")

Authors: ? (possibly \$\$\$) Research organizations, Consortia: \$\$ - \$\$\$

Closed access (traditional subscription) + manuscript w/ CC-BY license

- cOAlition S-funded authors can place CC BY license on **author accepted manuscripts** (AAM), i.e., w/o final typesetting
- Applied e.g. by AAAS (Science)
- Results in two parallel versions

Closed + Rights Retention

Authors: n/a Subscribers (libraries): \$\$ (no extra charge for manuscript w/ CC BY)

Dual approach:

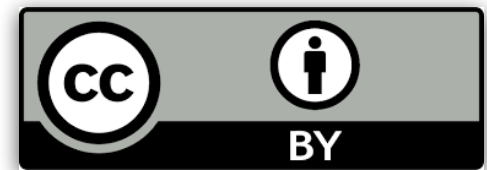
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SCOAP3

Diamond OA

- Sponsoring Consortium for OA Publishing in Particle Physics
- Partnership: publishers and 3,000+ libraries, research centres, universities
- Initiated & led by CERN
- Subscriptions funds redirected into common pool; central payment

- 4 journals converted to OA, 2 others for HEP content
- Requires complex high-level agreements & thoughtful governance

Authors: n/a Sponsoring organizations: \$\$

Collaborative Agreements

Diamond OA

- Continued (and new) library subscriptions for universal OA: all authors, all readers
- Aims at transparent models w/o direct costs to readers or authors
- Journals (only!) flips to OA if (~95%) **threshold** of subscription is met
- Uses **existing infrastructure** (budget handling, licensing, etc.)
- Reflects **specific information needs** of specialised research community
- Typically no changes for authors —> **high acceptance expected**
- Example: Subscribe to Open (S2O)

Authors: n/a Subscribers (libraries): \$\$ (possible discount)



PUBLICATION BUSINESS MODELS

Status	Model	Who pays?	How much?	Who can read?	Who can publish?	Plan S compliant?	Costs? (*)
Closed	Subscription (incl. hybrid journals)	Libraries	Too much	Scientists at subscribing institutions	Everyone	No	
	Subscription + Self-Archiving using Rights Retention (e.g., AAAS Science Magazine)	Libraries	Too much	Everyone (Author Accepted Manuscript, AAM)	Everyone	Yes	 Costs of journal subscription
Gold OA (APCs)	Commercial and society publishers	Authors	Depends on publisher	Everyone	Paying authors	Yes	
	Overlay journals e.g., <i>The Open Journal of Astrophysics</i>	Authors	Very little	Everyone	Paying authors	Yes	
Transformative Agreements (max. 3 yrs.)	Read-and-Publish (RAP) agreement	Libraries, Funding organisations	Based on previous subscriptions	Everyone	Authors from funding organisations	3 years	
	Publish-and-Read (PAR) agreement	Libraries, Funding organisations	Calculated on estimated publishing volume	Everyone	Authors from funding organisations	3 years	
Diamond OA (Library support)	Subscribe to Open (S2O) e.g., <i>Annual Reviews</i>	Libraries, Funding organisations	Based on previous subscriptions	Everyone	Everyone	Yes	
	SCOAP3 (CERN-led HEP consortium)	Libraries, Sponsoring HEP organisations	Negotiations with publishers	Everyone	Everyone	Yes	

PUBLICATION BUSINESS MODELS

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Closed	Subscription (incl. hybrid journals)	Libraries	Too much	Scientists at subscribing institutions	Everyone	No	
Closed with Rights Retention	Subscription + Self-Archiving using Rights Retention (e.g., AAAS Science Magazine)	Libraries	Too much	Everyone (Author Accepted Manuscript, AAM)	Everyone	Yes	 Costs of journal subscription
Gold OA (APCs)	Commercial and society publishers	Authors	Depends on publisher	Everyone	Paying authors	Yes	
	Overlay journals e.g., The Open Journal of Astrophysics	Authors	Very little	Everyone	Paying authors	Yes	
Transformative Agreements (max. 3 yrs.)	Read-and-Publish (RAP) agreement	Libraries, Funding organisations	Based on previous subscriptions	Everyone	Authors from funding organisations	3 years	
	Publish-and-Read (PAR) agreement	Libraries, Funding organisations	Calculated on estimated publishing volume	Everyone	Authors from funding organisations	3 years	
Diamond OA (library support)	Subscribe to Open (S2O) e.g., Annual Reviews	Libraries, Funding organisations	Based on previous subscriptions	Everyone	Everyone	Yes	
	SCOAP3 (CERN-led HEP consortium)	Libraries, Sponsoring HEP organisations	Negotiations with publishers	Everyone	Everyone	Yes	

DOI 10.18727/doc/10 | CC-BY 4.0
Uta Grothkopf, ESO Library and Information Centre
April 2021

* The estimated cost evolution reflects the personal opinion of the author.



- **Closed + Self Archiving using Rights Retention:**

Results in two versions of the same manuscript.

- **Gold OA with APCs:**

Savings through APCs?

New infrastructure needed.

Ethical questions to be answered (distribution of available funds).

Disruptive for authors.

- **Gold OA, overlay journals:**

Danger of losing publishers' expertise.

Based on grants & volunteer effort; is it sustainable?

- **Transformative agreements:** Yet another dependency (APCs instead of subscription prices).

Will we see actual savings?

Will they "cement" APCs for OA?

How about small, specialised libraries for whom benefits of access to large portfolio is often only marginal?

- **Diamond OA, Subscribe to Open (S2O):**

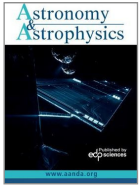
Any immediate savings? May stay closed.

- **Diamond OA, SCOAP3:**

Very complex model. Only specific articles are OA



Astronomy & Astrophysics (A&A)

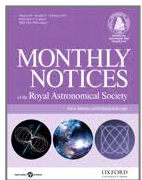


- Mostly **Diamond** model (slightly modified S2O)
- Implementation ideally as of 2022
 - **Reading:** continue with library subscriptions to achieve global read-access (if subscription threshold (~95%) is met).
 - **Publishing:** A&A Member States contributions to cover publishing costs for MS authors; moderate publishing fee for non-MS authors (EUR 100 / page)
- No changes for majority of authors
- No publishing charges if 1st author from A&A member state
- Further info:
 - <https://www.aanda.org/for-authors/author-information/open-access>



AAS (ApJ / Suppl. / Letters, AJ)

- Full OA as of 2022
- **Gold** model
- Costs to be covered by authors (approx. USD 1,100 - 4,500)
- Access barrier shifted from reading to publishing
- Requires new infrastructure for those not used to page charges
- Further info: <https://journals.aas.org/oa/>



MNRAS: tbd

CHOICES IN THE PUBLISHING PROCESS



Subscription-based

Delayed / temporary OA (if at all)
Usage rights governed by publisher



Immediate, permanent access for all

Free to read, use, copy, index, distribute, text-mine with proper attribution

Most common licenses:

Creative Commons Attribution (CC BY)

Gold OA: Article Processing Charges (APCs)

Diamond (Platinum) OA: no direct costs to readers or authors



Green OA: author self-archiving (e.g., arXiv)

Often only “free to read”, not version of record



Hybrid Journals:

Subscriptions + **APCs** for articles: “double-dipping”

Business model being phased out

Image credit: Pixabay.com

Initial questions

- Grant holders: funder requirements?
- All researchers: requirements from your university / institute / organization?



Where to publish?

- Usual quality and subject-related criteria
- Consult your **librarians** re. existing OA agreements
- Use tools such as the **DOAJ** (Directory of Open Access Journals, <https://doaj.org/>) and **OpenDOAR** (Directory of Open Access Repositories, <https://v2.sherpa.ac.uk/opensoar/>)
- Any **publication platforms** (repositories) set up by funder?



<https://open-research-europe.ec.europa.eu/>



- Publishing platform for scientific papers from EU's funding programmes
- Immediate open access, refereeing, re-usage rights, no costs to authors

Check

- Avoid publishing in a “predatory” journal:

Think-Check-Submit

(<https://thinkchecksubmit.org/>)

- Funder compliancy: Plan S Journal Checker tool

(<https://journalcheckertool.org>)



Choose the right journal or publisher for your research

Costs

- Find out publishing fees (APCs, page charges, publishing fees)
- Check local funding sources (grants, university budgets, library funds, etc.)
- Check possible waiver policies

Shape the development of scientific publishing

- Team up with your local librarians, administrators, other researchers to define best way forward
- Reach out to publishers to let them know your view



Image credit: Pixabay

PLAN S JOURNAL CHECKER TOOL

Currently BETA version: <https://journalcheckertool.org>

Is this compliant with Plan S?

JOURNAL: Astronomy and Astrophysics (ED) + MY FUNDER: European Commission(Horizon I) + MY INSTITUTION: European Southern Observat =

No affiliation

Yes, this combination is compliant.

Compliant Routes

Self-archiving

You are able to comply with Plan S via Self-archiving.

The following checks were carried out to determine whether the right exists to comply with Plan S via self-archiving. Data from Open Access Button Permissions (OAB Permissions) is used to see if the publisher's policy of self-archiving enables compliance. If it does not or if an unknown answer has been returned then data on cOAlition S Implementation Roadmap data is checked to see if cOAlition S's Rights Retention Strategy provides a route to compliance :

- Check Open Access Button Permissions for journal
 - The journal is found by OAB Permissions
- Check if OAB Permissions says the journal allows archiving
 - OAB Permissions confirms the journal allows archiving
- Check if postprint or publisher PDF can be archived
 - Postprint can be archived
- Check there is no embargo period
 - There is no embargo period
- Check there is a suitable licence

What options do I have?

SELF-ARCHIVING USING RIGHTS RETENTION

You have the right to self-archive the author accepted manuscript should you choose. More information on how available [here](#).

START OVER **EXPLAIN THIS RESULT**

THE LARGER VIEW

OA movement affects scholarly communication:

- **Effect 1:** toll access barriers removed
- **Effect 2:** insecurities and questions, e.g.
 - Who pays publishing costs? How much? Future of journals?
 - Freedom to choose where to publish?
- **Effect 3:** how will scholarly publishing look in 5 years?



Paradigm shift towards Open Science

- Open Access, Open Source, Open Data, Open Notebooks, Open Reviews, etc.
- FAIR principles: **F**indable - **A**ccessible - **I**nteroperable - **R**eusable
(<https://www.go-fair.org/fair-principles/>)



Research assessment / evaluation

- Active **support of Open Science activities**
- No more *Journal Impact Factor* (journal-level), but **article-level metrics**
- Evaluation processes should be transparent, robust, diverse
(see **DORA** - Declaration of Research Assessment, <https://sfdora.org>)



TAKE AWAY MESSAGES

▶ Tradition of sharing in astronomy, but “free to read” is not OA



▶ Open Access is here to stay. Funders increasingly demand research from their grants to be OA



▶ OA is good science practice and brings many societal benefits. Astronomy is not (should not be) outside of “industry standards”



▶ Unique moment to implement wide-ranging changes in scholarly communications, e.g., FAIR principles
(**F**indable / **A**ccessible / **I**nteroperable / **R**eusable)



▶ Collaborative effort (researchers, librarians, administrators, publishers) necessary to achieve **equitable, transparent, and sustainable Open Access** (Open Science) agreements

