EXPLORING THE INTERACTION OF SPIN AND ORBITAL ANGULAR MOMENTUM OF LIGHT WITH CHIRAL PHOTONIC STRUCTURES

A Data Management Plan created using DMPonline.be

Creators: Guy Koeckelberghs, n.n. n.n., n.n. n.n.

Affiliation: KU Leuven (KUL)

Template: KU Leuven BOF-IOF

Principal Investigator: n.n. n.n., Guy Koeckelberghs, n.n. n.n.

Grant number / URL: 3E230467

ID: 206534

Start date: 01-10-2023

End date: 01-03-2029

Project abstract:
Optical activity effects such as circular dichroism and optical rotation are well-known. They originate from the interaction of the chiral material with
the spin angular momentum (SAM) of light (±ħ, where + and – refer to left- and right-hand circularly polarized light). However, it is less known that
light can also carry orbital angular momentum (OAM). For example, for light with helical phase fronts, such as in optical vortices, the OAM per photon
is given by ±ħ, with the topological charge of the vortex. Recent studies have indicated that photons with opposite OAM - in addition to spin - can
also show a different interaction with a material that is chiral organized. Hence for a complete understanding of the interaction between light and chiral
matter, both SAM and OAM of photons must be considered, which is the goal of this proposal. It is mainly an experimental project in which photonic
crystals based on chiral conjugated polymers will be interrogated with light that carries both SAM an OAM.

Last modified: 17-04-2024

EXPLORING THE INTERACTION OF SPIN AND ORBITAL ANGULAR MOMENTUM OF LIGHT WITH CHIRAL PHOTONIC STRUCTURES

RESEARCH DATA SUMMARY

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

Dataset name / ID	Description	New or reuse *Indicate: **N**(ew*	Digital or Physical data Indicate: **D**(igital) or **DP**(hysical)	Data Type Indicate:	File format	Data volume Indicate:	Physical volume

		data) or ***E****(xisting data)*		**A**udiovisual		<1GB	
				Images		<100GB	
				Sound		<1TB	
				Numerical **T**extual		<5TB	
				Model		>5TB	
				SOftware		NA	
				Other (specify)			
Spectral measurements	UV-vis, CD, fluorescence	N	D	N	txt	<1GB	
Synthesis	monomers, polymer, ...	N	DP	other			>10g
laser optical data	second, third harmonic scattering, linear scattering optical rotation	N	D	N	txt	<1GB	
Standar characterization	GPC, NMR, Mass spectro	N	D	N	txt	<1GB	
Samples	photonic crystals	N	DP	other			solid film on glass

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

No

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.

- No

Will you process personal data? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).

- No

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, …)? If so, please comment per dataset or data type where appropriate.

- No

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material or Data transfer agreements, Research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- No

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- No

DOCUMENTATION AND METADATA

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g. in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, codebook.tsv etc. where this information is recorded).

for numerical we will add additional text files with all necessary information
for physical samples we will use appropriate labelling with reference to lab notebook

Will a metadata standard be used to make it easier to find and reuse the data?
If so, please specify which metadata standard will be used.

If not, please specify which metadata will be created to make the data easier to find and reuse.

- No

for numerical we will add additional text files with all necessary information
for physical samples we will use appropriate labelling with reference to lab notebook

DATA STORAGE & BACK-UP DURING THE RESEARCH PROJECT

Where will the data be stored?

- Other (specify below)

Both on hardware (dedicated hard disks) as in the cloud (directly connected), provided by SET-IT.
samples and polymers/monomers will be stored according to safety procedures (eg fridge or dedicated cabinets).

How will the data be backed up?

- Standard back-up provided by KU Leuven ICTS for my storage solution

Co-managed by set-IT in addition to dedicated hard drives.

Is there currently sufficient storage & backup capacity during the project?

If no or insufficient storage or backup capacities are available, explain how this will be taken care of.

- Yes

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

Data are password protected.
Physical can only be accessed by authorized persons

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

Yearly contribution to SET-IT, partly paid by chemistry department (>2000 euro/year)

DATA PRESERVATION AFTER THE END OF THE RESEARCH PROJECT

Which data will be retained for 10 years (or longer, in agreement with other retention policies that are applicable) after the end of the project?

In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

- Certain data cannot be kept for 10 years (explain below)

Monomeric/polymeric samples and photonic crystals may degrade over time.

Where will these data be archived (stored and curated for the long-term)?

- Other (specify below)

Archive drives managed by SET-IT and dedicated hard drives

Physical samples will be stored according to safety procedures (eg fridge or dedicated cabinets).

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

negligeble

DATA SHARING AND REUSE

Will the data (or part of the data) be made available for reuse after/during the project?
Please explain per dataset or data type which data will be made available.

- Yes, as open data

all raw data are available upon request and available trough supporting information of published articles/theses
physical: upon request and availability

If access is restricted, please specify who will be able to access the data and under what conditions.

no

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)?

Please explain per dataset or data type where appropriate.

- No

Where will the data be made available?

If already known, please provide a repository per dataset or data type.

- KU Leuven RDR (Research Data Repository)

Numerical data: through RDR
physical samples: upon request and available in the contributing labs

When will the data be made available?

- Upon publication of research results

Which data usage licenses are you going to provide?

If none, please explain why.

- Other (specify below)

Not applicable

Do you intend to add a persistent identifier (PID) to your dataset(s), e.g. a DOI or accession number? If already available, please provide it here.

- No

not applicable

What are the expected costs for data sharing? How will these costs be covered?

negligeble

RESPONSIBILITIES

Who will manage data documentation and metadata during the research project?

all co-promotors

Who will manage data storage and backup during the research project?

all co-promotors

Who will manage data preservation and sharing?

all co-promotors

Who will update and implement this DMP?

all co-promotors