DATA MANAGEMENT PLAN

1. Data description and collection or re-use of existing data
How will new data be collected or produced and/or how will existing data be re-used?
New data will be generated as a result of the research tasks proposed in this project. Data will be produced in digital form by specialized software (i.e. Python, GAIA, DS9, TOPCAT and others). Raw instrumental data and catalogs are being produced by our collaborators and are going to be made available to us during the project. For each piece od data we do have a permition for use, whether it is given by the owner of the data, or it is a consequence of us being a part of a given collaboration. All the aquired data will be processed by a person responsible for a particular task using appropriate software tools to obtain user-friendly numeric data that will be used/reused by our team.
What data (for example the kinds, formats, and volumes) will be collected or produced?
Data will be mainly, but not exclusively, collected as: • plain ascii tables, • astronomical images in the .fits format, • plots and images (as .tif, .jpeg, .png, .bmp and other graphic formats and densitograms), • manually entered numeric and text records stored as tabularized database in . xlsx format Existing data will be reused after a manual or automatized data import from digital and analogue data sources. In the case of re-use of data from analogue sources (e.g. a publication) they will be transformed to digital form, and stored as tabularized database in plain ascii table format.

2. Documentation and data quality
What metadata and documentation (for example methodology or data collection and way of organising data) will accompany data?
Raw instrumental data will be organize in a software-specific manner. When possible raw data will be accompanied by technical metadata like sample code, acquisition date, experiment date and details, data, authors, and others. Processed, manually entered and reused data will be organized in tabularized datasets accompanied by metadata: *Title, Subject, Description, Creator, Publisher, Contributor, Date, Type, Format, identifier, Source, Language, Relation, Coverage and Rights, Grant number* or others if it will be necessary. The metadata will be disseminated in the repository according to its standards (usually Dublin Core).
What data quality control measures will be used?
Data will be obtained by a qualified person responsible for a particular task using a particular software and validated analytical methods. To avoid mistypes, manually entered data will be cross-checked by a second person involved in the project. Software tools included in a database and statistical software packages will be used to check data consistency and if they are in appropriate formats. In depth explanation on samples used, methodologies and data processing applied in the course of the study that lead to the production of the data being uploaded in a repository will be given in README files.

3. Storage and backup during the research process
How will data and metadata be stored and backed up during the research process?

Data will be stored in the electronic form in a mass storage device (usually the personal computer of both the person responsible for a particular task and the project manager). All the data will be backed up regularly by a person responsible for the particular task (at least once per month), using operating system-included tools using external hard drives. External hard discs will be stored at the Nicolaus Copernicus University Astronomy institute and closed in a locker. Processed data will be backed up in a similar manner, as soon as possible after creation, and it will be a responsibility of the person that obtained the data.

How will data security and protection of sensitive data be taken care of during the research?

We will not produce and store sensitive data.

4. Legal requirements, codes of conduct

If personal data are processed, how will compliance with legislation on personal data and on data security be ensured?

Not applicable

How will other legal issues, such as intelectual property rights and ownership, be managed? What legislation is applicable?

All intellectual property or property rights will belong to the data production and processing team. An agreement will be signed with such people regarding the disposal and dissemination of them on the Internet under free Creative Commons licenses in accordance with the recommendations of NCN. Licenses will be agreed upon between the project members.

5. Data sharing and long-term preservation

How and when will data be shared ? Are there possible restrictions to data sharing or embargo reasons?

The data will be shared maximum half a year after the release of the official publication of the main findings. We will publish all our research in a well-established pear reviewed journals and, if required by the journal, include raw and/or user friendly processed datasets as supplementary data. If not, data will be shared in chosen repositories and databases appropriate to data format (e.g. Repository for Open Data – repOD https://repod.pon.edu.pl/ or one focused on dissemination of data in astronomy). The data shared via repository will be prior selected, organized, and prepared in a user friendly manner (FAIR rules).

How will data for preservation be selected, and where will data be preserved long-term (for example a data repository or archive)?

The raw data will be preserved by our collaborators in a manner appriopriate for their home institutions. The processed data, resulting from this project, will be preserved on hard drives and if possible on university servers and in scientific repositories. Repositories-shared data will be available as long as the repository will exist.

What methods or software tools will be needed to access and use the data?

Data will always be exported to formats readable by open-source software. Processed data will be accessible using standard office applications or open standards (e.g.: .odt, .ods, .pdf).

How will the application of a unique and persistent identifier (such us a Digital Object Identifier (DOI)) to each data set be ensured?

Data will be deposited and shared only in repositories offering the unique and persistent identifier Digital Object Identifier (DOI), or others specific to a particular repository, for free.

6. Data management responsibilities and resources

Who (for example role, position, and institution) will be responsible for data mangement (i.e the data steward)?

The main responsibility will lie on the project manager. This will include the preparation of final files and their upload into a chosen repository along with metadata. In addition, each person working on a particular task will also be responsible for proper management of data involved in their work.

What resources (for example financial and time) will be dedicated to data management and ensuring the data will be FAIR (Findable, Accessible, Interoperable, Re-usable)?

The responsibility for the proper data management, ensuring that the data will be FAIR, will lie on project team members. After completion of the project, such work will be carried out by the project manager who is a statutory employee of the University. The costs of deposition of data in specialized repositories may be incurred for the costs of the project when necessary. Hard drives dedicated to project-related data backup will be purchased from the project's funding.