



## **Herschel duplication policies**

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### **1. Background**

The Herschel Space Observatory mission lifetime is cryogen limited, when all helium has been used up the observatory will cease to function. As stated in the Announcement of Opportunity (AO) Policies & Procedures document, in order to maximise the overall science return of Herschel newly proposed observations which duplicate observations already approved in previous proposal cycles will in general not be permitted.

The basic policy that will be followed to resolve duplication issues is that if a proposed observation essentially **duplicates the science** contained in any of the **observations already approved for execution**, then it will be considered a potential duplicate observation.

In practice, duplications will be determined on a case by case basis by consideration of the target observed, the observing mode used, the observation parameters (e.g. similar spatial coverage, size and depth of maps, considerable overlap between wavelength ranges when using the same instrument for spectra, same filters for photometric observations) and the scientific objective.

This memo provides the necessary clarifications regarding what to consider as a potential duplication and the policies and procedures to follow when such cases are identified either by the user before proposal submission or by the Herschel Science Centre (HSC), the HOTAC, or other observers (see sec.3) after proposal submission. This memo specifically addresses the open time (OT) Key Programme (KP) call, for future calls the associated AO documentation will be updated to include this information.



## 2. Duplicated observations

In general, two observations are considered to be potential duplications if they are executed on the same position of the sky and covering the same spectral region (this must be interpreted as: same photometric filter for imaging observations; same spectral line for line spectroscopy or same spectral range for range spectroscopy) when any of the following conditions are met:

- Both observations are performed with the same instrument and Astronomical Observation Template (AOT) (\*)
- One observation is performed with PACS line spectroscopy and the other with PACS range spectroscopy
- One observation is performed with PACS photometer and the other with SPIRE PACS parallel mode
- One observation is performed with SPIRE photometer and the other with SPIRE PACS parallel mode

Unless at least one of the following conditions are also applicable:

- The areas in the sky covered by two proposed imaging observations do not overlap by more than 25% of either of the fields/areas being compared
- The integration time per area of the sky for each observation differs by at least a factor of 4 (corresponding to a factor of 2 in sensitivity)
- The spectral range covered by two proposed spectroscopic observations do not overlap by more than 25% of either of the spectral ranges being compared.
- In the case of line spectroscopy the integration time on the same spectral line differs by at least a factor of 4 (corresponding to a factor of 2 in sensitivity)
- In the case of range spectroscopy, the integration time on the same spectral range differs by at least a factor of 4 (corresponding to a factor of 2 in sensitivity)

One natural exception to the above policy are observations of time-variable phenomena. In this case, a single epoch observation of a given target/sky field will not disallow a subsequent request for a time-series of observations, made after the former was approved for execution.

(\*) Astronomical Observation Templates are: PACS line spectroscopy, PACS range spectroscopy, PACS photometer, SPIRE spectrometer, SPIRE photometer, SPIRE PACS Parallel mode, HIFI single point, HIFI mapping, and HIFI spectral scan observations.



### 3. Duplication checks: policies and procedures

The list of approved observations which cannot be duplicated by other proposers is contained in the so-called 'Reserved Observations List'. This list can be queried with the help of a java-based application called the Reserved Observation List Search Tool which is available through the HSC web pages under the 'AO Tools' button, or by directly typing the following URL:

*<http://satls01.esac.esa.int/herschel/rol/rol.html>*

This list will be updated every time the observations database is modified (e.g. after a new set of observations are approved following each call for proposals and/or after new discretionary time observations are approved).

It is the responsibility of any investigator to avoid proposing duplicate observations. Users are requested to check for the existence of potential duplications among their proposed observations by using the Reserved Observation List Search Tool (\*\*). Any proposed observation deemed a potential duplication considering the above criteria will in general be forbidden unless a justification is provided in the dedicated section of the proposal submission form where relation to other existing observations are described. The user must explain why the proposed observations should not be considered as duplications.

Exceptionally, newly proposed observations that are confirmed duplications can still be considered for approval if there are solid reasons behind, on a case by case basis. Examples include observations of large areas of the sky where cutting out a small area to avoid overlap with a previously approved observation results in less efficient usage of Herschel observing time. These cases need the approval of the Herschel Project Scientist, or designee.

In general, the data corresponding to an approved duplicate observation will be embargoed by the HSC (thus not released) until the proprietary rights of the original observer end, unless an agreement is reached with the owner of the already approved observations to lift this embargo in advance.

(\*\*) For some observing modes the user will need to check the AOR details using the 'View accepted proposal' option under the 'File' menu of HSpot in order to confirm whether a suspected duplication is indeed a real duplication



Although the HSC will make every effort to identify all duplicate observations, it is also the responsibility of the Principal Investigators of approved programmes to check the Reserved Observations List after every call to determine if any of the newly approved AORs are duplicating their approved observations. The HSC should be alerted if any such case is detected.

Duplication checks will be systematically performed by the HSC on the submitted proposals as part of the standard technical checkout immediately after the closure of every call. The newly submitted AORs will be verified for non-duplication against previously accepted AORs as well as among the proposals submitted in the same call. The HOTAC will be informed of the identified duplications in each round of submissions and allocate time eventually based on scientific arguments. However, the HOTAC is expected to solve only the most obvious cases, where duplications are identified at proposal level (e.g. those proposals showing a large degree of overlap), while the HSC will take care of all the remaining duplications, once the HOTAC results are available.

These are expected to correspond to those accepted proposals where the level of overlap with already approved proposals or with proposals submitted in the same call is relatively small in terms of observing time, and the number of duplicated AORs is reduced, and will be resolved on a case by case basis.

Duplicated observations in the newly submitted proposals will be blocked and the PI's of those accepted proposals containing duplicated AORs will be contacted by the HSC by the start of Phase 2 data entry. They will be informed about the identified duplications and recommended to adapt their observing programmes in the most efficient way to maximise the scientific return of the mission. This may imply removal of the duplicated set of observations if the duplication is with observations already approved in previous calls as they will always take priority. In the case of duplications among newly submitted proposals the coordinated distribution of the duplicate observations among the proposals affected or sharing the data if this is agreed by the corresponding PIs will be recommended. Decisions adopted by the affected PIs must be communicated to the HSC before the observations are released for scheduling. In case of conflict, priority will be given to those observations in the proposal which received the highest ranking in the review process and the other(s) will have to remove the offending AOR(s). The Herschel Project Scientist, or designee, will have in any case the final authority to either allow or disallow duplicated observations.