The Next Generation of Thermal-IR Astronomy

12 - 16 November 2018 @ Snellius

Astronomical observations in the thermal infrared wavelength regime (3-26 micron) provide a powerful tool to discover and characterise the most obscured sources in the universe. However, observations in the thermal infrared are very challenging due to the bright background by the telescope and atmosphere and require exquisite calibration techniques in order to enable cutting-edge research themes.

Outcome of the workshop

a) A global road-map of activities to quantitatively determine all sources of systematic uncertainties and achieve the background photon-noise limit in ground-based thermal-IR observations (collaboratively created in a Google spreadsheet throughout the workshop); with the commitment to work on actions (deadlines, follow-up videocons).
b) A new international collaboration (inauguration of "The Inter-National Thermal-Infrared Network", TINTIN) with the intention to organise a second workshop of this kind in 2020.
c) A conclusive accounting of the sources of systematic uncertainties in thermal-IR observations, their quantitative impact, and ways to minimise them: in the design of instrument and telescopes, observing techniques, and in the post-processing of data. This activity has started at the Lorentz center, but is not yet completed. We intend to complete this activity this year and summarise it in a peer-reviewed publication.

Scientific breakthroughs

a) By comparing the design of existing telescopes, we realised (apparently for the first time) what impact the design of the secondary mirror as well as the cryostat window have on the thermal background
b) The limitations of the current detector technology (Aquarius) were clearly recognised by the entire thermal-IR community, providing strong international support for a shift towards a new detector type (GeoSnap).

"Aha" moments

The impact of a special observing mode ("drift scanning") was compared among observatories and a common sensitivity improvement by about a factor of two was found for three very different instruments.

For most participants the format of the workshop was new. After two days of talks and discussions, we split up into four smaller project groups to tackle specific problems that had been collected previous to and in the first two days of the workshop. We came together regularly to report to each other about progress and challenges. Many participants played an active role and the final project summaries showed significant progress, but most importantly these "project days" helped us to train junior scientists and build the international collaboration in which we will continue to work towards our goals.

Other comments: The Lorentz Center / Snellius location is an inspiring space to work together on complex questions in flexible / variable groups

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