

Herschel celestial calibration sources

Four large main-belt asteroids as prime flux calibrators for the far-IR/sub-mm range

**Thomas Müller · Zoltán Balog · Markus Nielbock ·
Tanya Lim · David Teyssier · Michael Olberg ·
Ulrich Klaas · Hendrik Linz · Bruno Altieri ·
Chris Pearson · George Bendo · Esa Vilenius**

Received: 5 July 2013 / Accepted: 26 September 2013
© Springer Science+Business Media Dordrecht 2013

Abstract Celestial standards play a major role in observational astrophysics. They are needed to characterise the performance of instruments and are paramount for photometric calibration. During the Herschel Calibration Asteroid Preparatory Programme approximately 50 asteroids have been established as far-IR/sub-mm/mm calibrators for Herschel. The selected asteroids fill the flux gap between the sub-mm/mm calibrators Mars, Uranus and Neptune, and the mid-IR bright calibration stars. All three Herschel instruments observed asteroids for various calibration purposes, including pointing tests, absolute flux calibration, relative spectral response

T. Müller (✉) · E. Vilenius
Max Planck Institute for Extraterrestrial Physics,
PO Box 1312, Giessenbachstrasse, 85741, Garching, Germany
e-mail: tmueller@mpe.mpg.de

Z. Balog · M. Nielbock · U. Klaas · H. Linz
Max Planck Institute for Astronomy,
Königstuhl 17, 69117, Heidelberg, Germany

T. Lim · C. Pearson
Space Science and Technology Department, RAL, Didcot,
OX11 0QX, Oxon, UK

D. Teyssier · B. Altieri
European Space Astronomy Centre (ESAC), ESA,
Villanueva de la Cañada, 28691 Madrid, Spain

M. Olberg
Onsala Space Observatory, Chalmers University of Technology,
43992 Onsala, Sweden

G. Bendo
UK ALMA Regional Centre Node, Jodrell Bank Centre for Astrophysics,
Manchester, M13 9PL, UK