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Herschel observations of the Hayabusa-2 asteroid 162173 (1999 JU3). L.O'Rourke[1] lorourke@esa.int, T.Müller[2], C.Kiss[3], A.Barucci[4], M.Yoshikawa[5], B.Altieri[1], B.Gònzalez-Garcìa[6], E.Dotto[7], M.Küppers[1], M.Sanchez Portal[1]

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Background: The JAXA Hayabusa-2 mission was approved in 2010 with launch planned for 2014. It is expected to arrive to the asteroid 162173 (1999JU3) in 2018, survey the asteroid for a year and a half, land & obtain surface material, then depart in December 2019, and return to the earth in December 2020.

The near-Earth asteroid 162173 (1999 JU3) is a C class asteroid, with a rotation of 0.3178 days, an effective diameter of 0.87 ± 0.03 km and a geometric albedo of 0.070 ± 0.006. Its published thermal inertia ranges between 200 and 600 J m^{-2} $s^{-0.5}$ K^{-1}.[1] It was chosen for the Hayabusa 2 mission due to its ideal orbit to allow the mission objectives to be achieved.

The Herschel observations : The MACH-11 (Measurements of 11 Asteroids & Comets) Programme observed this asteroid in early April of 2012. The observations performed had a duration of 1.3 hours with the target moving at this time approximately 34" between the visits thus providing the capability to characterize the different backgrounds. The observations were performed in the 70/160 filter combination to get the best possible S/N in both bands. 7 repetitions were performed in each of the 2 scan-directions for a better characterisation of the background.

Our Results : The asteroid was detected in the three bands. The flux extraction was hampered by the fact that the target was passing through a region of cirrus cloud, however, while impacting on the errors in our measurements, we were able to extract very accurate flux values.

We find that our measured flux values at the three wavelengths are lower than the estimated flux values (predicted from our model) pointing therefore to the fact that improvements in the current published values can be achieved with our measurements e.g. our thermal inertia points to a value closer to the upper value in the current published results.

Using three existing sets of published thermal observations (ground-based N-band, Akari IRC, Spitzer IRS), combined with our Herschel observations, we will run them within our thermophysical model. This thermophysical model (TPM) [2] has been validated against a large database of asteroids including targets of other spacecraft mission e.g. Lutetia [3], Itokawa [4].

We will provide a clear update to the known values of the radiometric properties of the asteroid. The calculations are to be performed for the full range of possible shape and spin-vector solutions derived from the available sample of visual lightcurve observations.

The output of our model will aid in confirming its rotation direction, we will derive the asteroids thermal inertia, as well as provide important information on the surface properties of this asteroid; important due to their relevance in the preparation of the Hayabusa 2 spacecraft.

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