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Herschel observations of the Rosetta target 67P/Churyumov-Gerasimenko L.O'Rourke[1] lorourke@esa.int, L.Jorda[2], D. Bockelee-Morvan[3], O. Groussin[2], M. Küppers[1], T. Müller[4]. C.Kiss[5], J. Crovisier[3], B.Altieri[6], B. Gònzalez-Garcìa[6], K. Altwegg[7], R.Schulz[8]

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Introduction: In June 2010, the Herschel Space Observatory observed comet 67P/Churyumov-Gerasimenko with the PACS Instrument when the comet was at a heliocentric distance of 4.1 AU. This comet is the prime target for the Rosetta spacecraft due to arrive to orbit it in mid-2014 [1].

Observations performed on 67P/Churyumov-Gerasimenko : A 2 hour cross scan PACS observation was executed observing the comet 67P/Churyumov-Gerasimenko. The comet was detected only at 70um with a significant extended emission in the processed data set. A follow-up "shadow" DDT observation in December 2010 of the area where the comet was located in the June timeframe took place to address the original slow moving nature of the comet at the time of the June observation. An empty background confirmed that what was observed by Herschel in June 2010 was indeed due to 67P.

Summary of data processing : Data processing was performed on all observation sets using the most recent HIPE software [2]. Special processing was performed to correct for pointing errors as well as to address the extended features visible in the observed comet images. The derived fluxes were aperture and colour corrected to obtain monochromatic flux densities at the PACS reference wavelengths.

Data Analysis – 67P : Our data analysis focuses on the expected dust emission around the comet nucleus at this distance which could have produced the flux obtained.

We conclude that the extended emission offset from the anti-velocity vector is the neckline of the comet linked to dust emitted about 100 days before perihelion (180 deg away in true anomaly = Nov.2008).

We present our modeling results which confirm the neckline. We also provide an explanation for the extended emission observed perpendicular to the nucleus position as well as the size & distribution of the dust particles that need to exist at that distance to explain both the neckline & its presence.

Conclusions: The benefits of Herschel in the study of comets will be highlighted. The results of observations of 67P are presented and reviewed with associated conclusions reached on the dust observed in its wake and dust production rates required to generate such dust. We compare our results to those of other published articles and look at the synergies possible in the merging of data from a multi-wavelength data set.

References: [1] Schwehm, G. H. (2003), *BAAS*, 35, 1001 [2] Ott, S. (2009), *Proceedings of the Astronomical Data Analysis Software and Systems XIX Conference*, 434, 139-142