

ASTEROID FAMILIES WITH LARGE PARTENT BODY

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Introducción: In this work we revisit the investigation of asteroid family formation by impact events started by Durda et al. (2007) and extended by Benavidez et al. (2012). Specifically, we determine if any asteroid family matches the features seen in the modeled SFDs. As a starting point, we select asteroid families with an alternative estimation of the parent body size with respect to previous estimations of its size by methods other than SPH/N-body simulations, following the approaches described by Tanga et al. (1999) and Campo Bagatin and Petit (2001). Then, from the sub-set of families analyzed by these authors we chose the families with large expected parent bodies (of order $D=400$ km) to compare with our new set of simulations using a chi-square test.

We have found fairly good matches for the Eunomia and Hygiea families. In addition, we identified a potential acceptable match to the Vesta family from a monolithic parent body of 468 km. The impact conditions of the best matches suggest that these families were formed in a dynamically excited belt. The results also suggest that the parent body of the Eunomia family could be a monolithic body of 382 km diameter, while the one for Hygiea could have a rubble-pile internal structure of 416 km diameter.

Fuentes:

- [1] Durda, D. D., Bottke, W. F., Nesvorný, D., Enke, B. L., Merline, W. J., Asphaug, E., & Richardson, D. C., *Icarus* 186, 498–516, 2007.
- [2] Benavidez, P. G., Durda, D. D., Enke, B. L., et al., *Icarus* 219, 57, 2012.
- [3] Tanga, P., Cellino, A., Michel, P., Zappalà, V., Paolicchi, P., & dell’Oro, A., *Icarus*, 141,65–78, 1999.
- [4] Campo Bagatin, A., & Petit, J.-M., *Icarus*, 149, 210, 2001.