SPECTRAL PROPERTIES OF SMALL BINARY ASTEROIDS. Myriam Pajuelo[1,2], Mirel Birlan[2], Francesca DeMeo[3], Benoit Carry[4,2], Jerome Berthier[2],[1]Pontificia Universidad Católica del Perú, Av. Universitaria 1801, San Miguel, Lima 32 (Peru), [2]IMCCE Observatoire de Paris, Paris (France), [3]Department of Earth and Planetary Sciences MIT, Cambridge MA (USA), [4]Observatoire de la Cote d'Azur, Nice (France).

Introduction: Binary asteroids serve as mini labs to test formation mechanisms and evolutionary paths of small rocky bodies. The population of binary asteroids is around 15% of all small asteroids (up to 10–15 km). According to the current theories, the formation of satellites of small asteroids is more likely linked with YORP-induced spin-up, rotational fission, and mass shedding; this processes depends on the composition and density of asteroids (and the latter can be assessed from the orbit of the satellite). The technique used in the determination of surface composition of asteroids is visible and NIR reflectance spectroscopy. These spectra are compared with meteorite spectra from databases, searching for analogue meteorites. Thus, to constrain the mention processes, it is of upmost importance to gather all these spectral information and classify it taxonomically.

In this work we present NIR spectra of 24 small binaries obtained using NASA IRTF telescope observed in the 0.8 - 2.5 μm spectral region, with aims at increasing the sample of binary asteroids with known spectra, and investigate whether they are more frequent among some taxonomic classes which can give clues between taxonomic class abundances and possible formation mechanisms. This is part of a spectroscopic survey of binary asteroids using Spex NASA IRTF telescope that started in 2015. The data is complemented with spectra from the MIT–UH–IRTF Joint Campaign for NEO Reconnaissance [1]. We model and analyze the data using M4AST (Modeling for asteroids), and interpret the spectra to assess the taxonomy, composition, and mineralogy of asteroids. Visible spectra are used as well whenever we found it.

Results: We have determine the taxonomic class of 24 binary asteroids, representing an increase of 21% of the sample of binaries with known taxonomic classification, obtained with the same telescope, the same instrument (SpeX/IRTF), and the same spectral classification standard [2], and technique (M4AST).

Conclusions: We determine the taxonomic class and most-likely meteorite analogue for all 24 targets, increasing the sample of binary asteroids with known taxonomy, and compare the distribution of taxonomic classes among near-Earth and inner belt binaries with that of the background population. Both populations agree with uncertainties but for C-types asteroids that are under-represented among binaries, which is unexpected for a formation scenario of satellites of small asteroids by YORP spin-up and rotational fission. The large uncertainty (~15%) must be improved to ascertain this point.

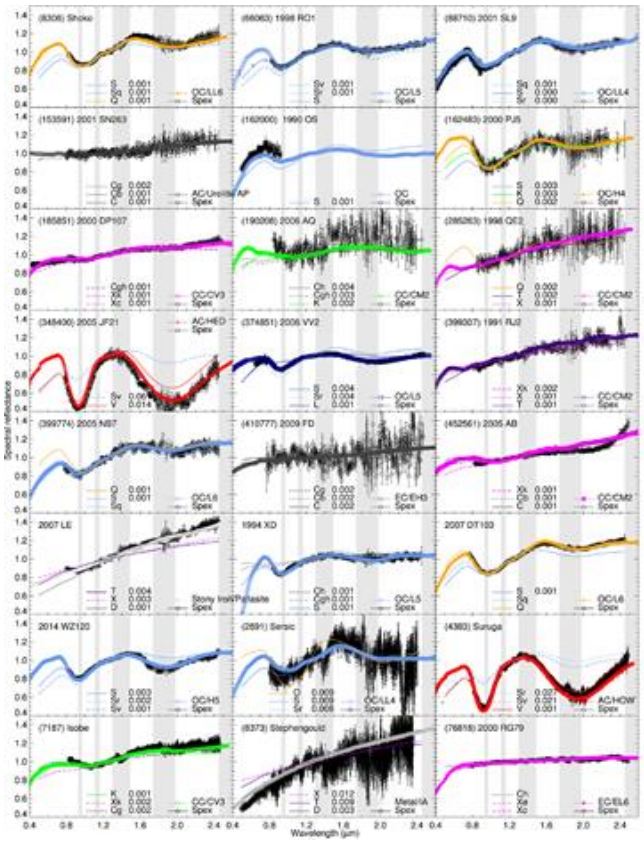

Figure 1. Some of the binary spectra studied, normalized to unity at 1.25µm matched with Bus-DeMeo taxonomy and meteorite spectra from RELAB database.

Acknowledgements: The authors gratefully acknowledge NASA IRTF and their operators, The

MIT–UH–IRTF Joint Campaign for NEO Reconnaissance, the NASA RELAB facility at Brown University, the IAU Minor planet Center, the NEA Database Service from the European Asteroid Research Node, the Planetary Data System, Johnston's Archive, and the VO tool Miriade service.

References: [1] Pajuelo, M., Birlan, M. Carry, B., DeMeo, F, Binzel, R. Berthier, J. (2018). *MNRAS* **477**, 7-8. [2] DeMeo F. E., Binzel R. P., Slivan S. M., Bus S. J., 2009, *Icarus*, **202**, 160.