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Experimental study of the nebular lightning theory on chondrule formation at the ISS

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Early Solar System processes which lead to chondrule formation are still matter of controversial scientific debate [1]. Although there are several promising theories, experimental validation is lacking. The EXCISS experiment, designed by students of the Goethe University Frankfurt was chosen during the Überflieger competition by DLR to be performed at the ISS in 2018. This study will experimentally test the nebular lightning theory on chondrule formation at the ISS [2].

During the experiment, forsterite particles will levitate in micro-gravity and will be exposed to electrical discharges. The melting and colliding of the particles as well as the formation of aggregates will be filmed. Detailed analyses of the aggregates after sample return is planned. The experiment will enable to decide if lightnings are a plausible process for chondrule formation.

[1] Arakawa, S. & Nakamoto, T. (2016) *Icarus* 276, 102–106. [2] Horányi, M. et al. (1995) *Icarus* 143, 87–105.

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Cite abstract as:

Matschey, Y., Schmuck, F., Beck, A., Christ, O., et al. (2017) Experimental study of the nebular lightning theory on chondrule formation at the ISS. Paneth Kolloquium, Nördlingen (Germany), abstract URL: <http://www.paneth.eu/PanethKolloquium/2017/0034.pdf> (abstract #0034).