

# From microstructure to planetesimal evolution: An experimental approach to stony-iron meteorite formation with SAPHiR

*Tuesday, 25 June 2019 16:15 (1 hour)*

Nicolas P. Walte <sup>1</sup>, Giulio F.D. Solferino <sup>2</sup>, Gregor J. Golabek <sup>3</sup>

<sup>1</sup> Heinz Meier-Leibnitz Zentrum (MLZ), FRM II, TU München.

<sup>2</sup> Department of Earth Sciences, Royal Holloway University of London, UK.

<sup>3</sup> Bayerisches Geoinstitut (BGI), Universität Bayreuth.

Pallasites, stony-iron meteorites composed of olivine crystals and Fe-Ni metal, are samples of the interior of early solar system bodies. However, the interpretation of pallasites is controversial with suggested origins either at the core-mantle boundary of planetesimals or from the shallower mantle that was disrupted by an impact. We present deformation experiments with the instrument SAPHiR to simulate pallasite formation. Our experiments show that pallasites preserve the two-stage evolution of their parent body including core-mantle differentiation and an impact event causing metal melt injection. Olivine clusters, important constituents of pallasites, are recognized as samples of a planetesimal mantle containing up to 15 vol% of primordial metallic melt not stemming from the impactor. This indicates high percolation thresholds and inefficient metal-silicate differentiation in asteroids not experiencing a magma ocean stage.

**Primary author:** WALTE, Nicolas

**Presenter:** WALTE, Nicolas

**Session Classification:** Poster session