

## Dust properties and composition in the coma of Mars-grazing comet C/2013 A1 Siding Spring

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### Abstract

Comet C/2013 A1 Siding Spring is a dynamically new comet from the Oort Cloud that crossed the inner solar system in 2014/15. On its way inbound, it passed Mars at a distance of only 140,000 km on 2014 October 19, creating a meteor shower and depositing dust into Mars's atmosphere.

We monitored the development of the coma of C/2013 A1 as it approached the inner solar system during a full year between October 2013 and September 2014, using the Very Large Telescope (VLT) of the European Southern Observatory (ESO) in Chile. We obtained spectra with the ESO/XSHOOTER multi-wavelength medium resolution spectrograph, and broadband images using FORS2.

The composition of the coma is constrained from the spectra. The near-infrared part is of particular interest for assessing the presence and evolution of icy grains in the coma. Dust properties are analyzed from the images. We constrain the dust production rate, size distribution and ejection velocity through numerical simulations.

Our results will contribute to better assess the effects of cometary material on the Martian atmosphere.