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Imaging of comet C/2013 A1 (Siding Spring) from the Martian surface

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Abstract:

Comet C/2013 A1 (Siding Spring) makes a close approach to Mars on 19 October 2014. The Opportunity rover's Pancam and Curiosity rover's Mastcam have the ability to image inner-coma structure before and after closest approach (CA), and to search for meteors. The CA occurs during day time for both rovers, early morning for Opportunity and late afternoon for Curiosity. During the sols (Martian solar days) leading up to CA, the comet is in the sky during early morning hours for both rovers; it is in the evening sky after CA. Curiosity's closest view is from near 600,000 km range—at this time, the nucleus is expected to be observable, but to be unresolved (sub-pixel diameter). Mastcam's M-100 camera has a 5° field-of-view (FOV) and a 0.05 mrad instantaneous FOV (iFOV)—52,000 km and 44 km at the rover-comet range, respectively—and the M-34 camera has a three times larger FOV and iFOV. Both cameras have RGB imaging capabilities. Opportunity's closest view is the morning before CA, at 400,000 km. Pancam has a broadband filter, a 16° FOV, and 0.27 mrad iFOV, which project to 109,000 km and 106 km, respectively. During the hours immediately after CA, when meteor impact rates are expected to be near their peak, the radiant is well below the horizon for Curiosity and the Sun remains up for Opportunity. The meteor rate would have to be elevated >100 times the background to be detectable at night (about 8 hours after CA for Curiosity's geometry). Detailed rover observing plans will not be made until near CA, and are subject to various operational constraints. Initial results will be presented.

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