

Potential for thermal IR detection of dust plume from DART impact on Didymos

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Following the decision by ESA member states at the last ministerial not to fund AIM, the opportunity to observe the DART impact plume at thermal infrared wavelengths has been lost. The proposed inclusion of SelfieSat in the DART mission will obtain valuable close-up observations of the impact and subsequent plume development for several minutes after impact, at a range of solar phase angles as it flies past Didymos. However, these observations will only be made at visible wavelengths, and, with the demise of AIM, the possibility of observing thermal emission from the plume will reside with ground-based or space telescopes. The detectability of a dust plume from the Earth depends critically on the, generally well-defined, capabilities of the telescope and instrument used, and the less predictable properties of the dust plume produced by DART. We present a simple model of the initial dust plume and determine its detectability by ground-based telescopes immediately after the impact. We investigate the sensitivity of the results to uncertainties in the characteristics of the plume and to assumptions made in this simple model. Preliminary results indicate that thermal emission of the plume may be detectable with large ground-based facilities. We hope that this presentation will stimulate discussion on how more detailed impact models can be used to improve and constrain these predictions.