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ASASSN-21qj: the direct detection and characterisation of an ice giant exoplanet collision towards a solar type star

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Observations of the young (about 300 million years old), solar-like star ASASSN-21qj has revealed an infrared excess consistent with a blackbody of around 1000 K with a luminosity of 4 per cent of the star, followed by an optical eclipse lasting over 500 days. The optical eclipse started 2.5 years after the infrared brightening - implying an orbital period of at least that duration - and the derived transverse velocity suggests that these observations are consistent with a collision between two exoplanets of several to tens of Earth masses at 2–16 astronomical units from the central star. Such an impact produces a hot, highly extended post-impact remnant with sufficient luminosity to explain the infrared observations. We will present simulations for the expected spectrum of the remnant, a synestia, which can be detected and characterised by the JWST, and discuss future observations which will further confirm our hypothesis.