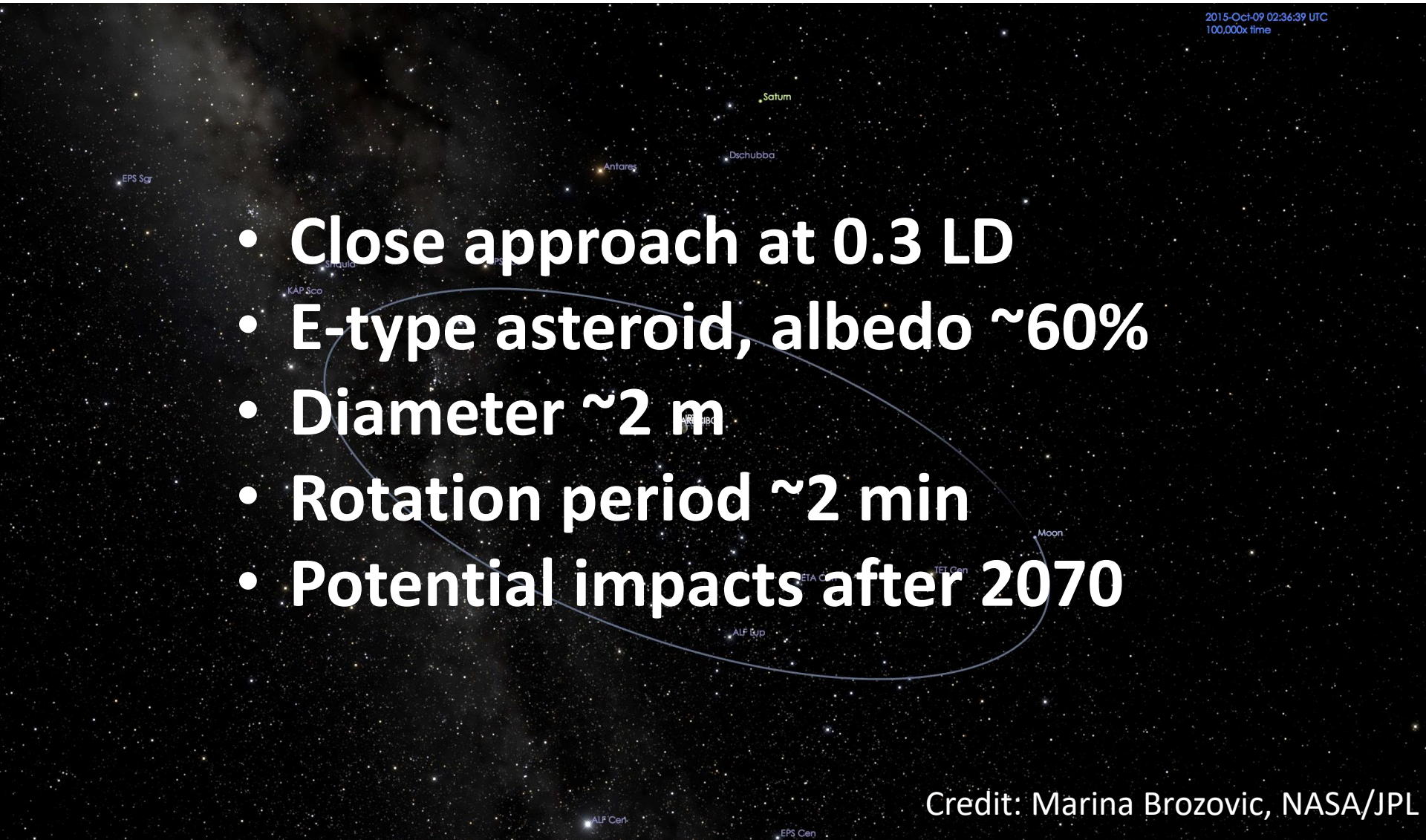
Mass estimate and close approaches of near-Earth asteroid 2015 TC_{25}

D. Farnocchia, J.D. Giorgini (JPL)
D.J. Tholen (UH), M. Micheli (ESA NEOCC)
W.H. Ryan (MRO)
P.A. Taylor, E.G. Rivera-Valentin (AO)

Jet Propulsion Laboratory
California Institute of Technology

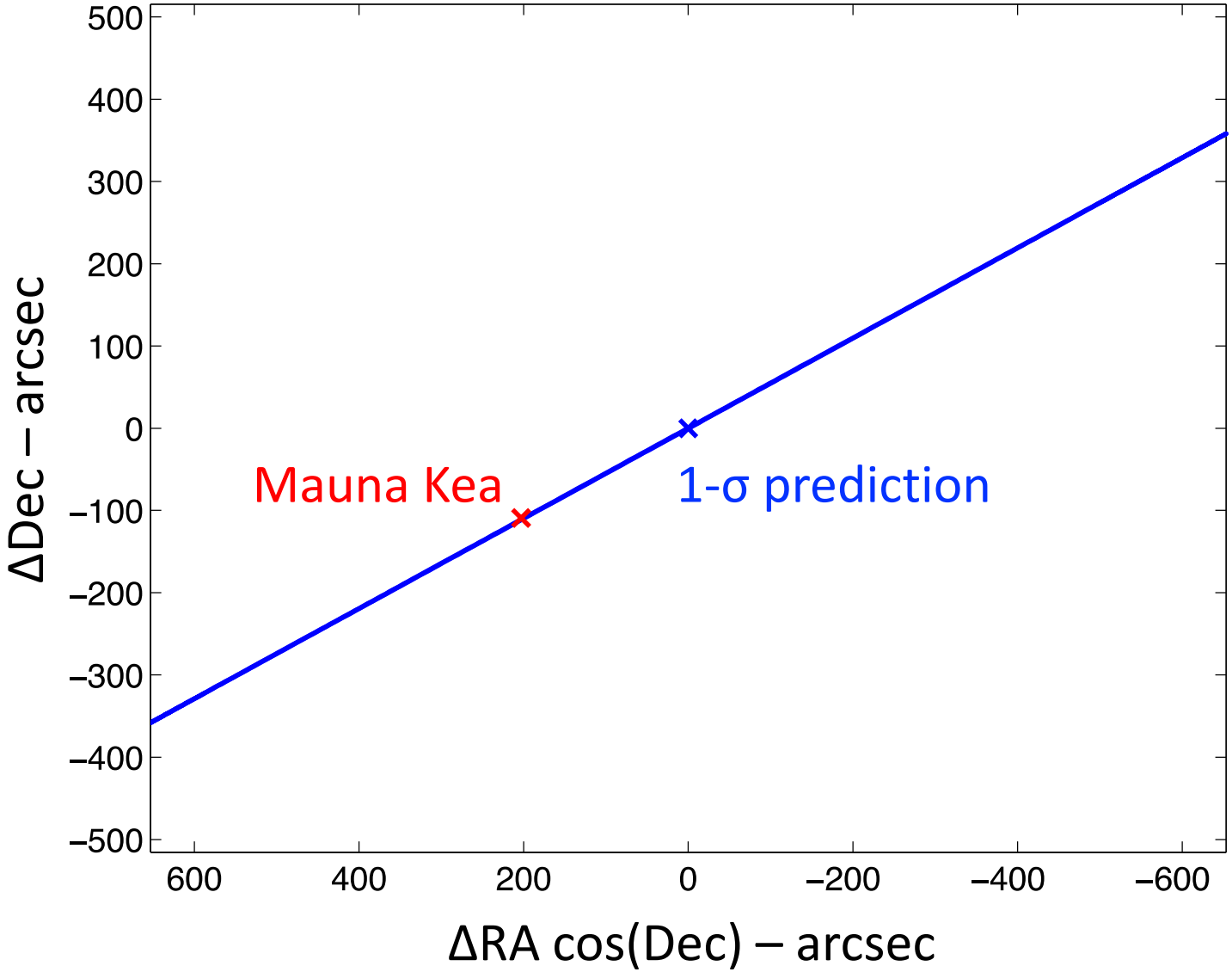
“It's a bird... It's a plane... It's the tiniest asteroid!” (Reddy et al., 2016)



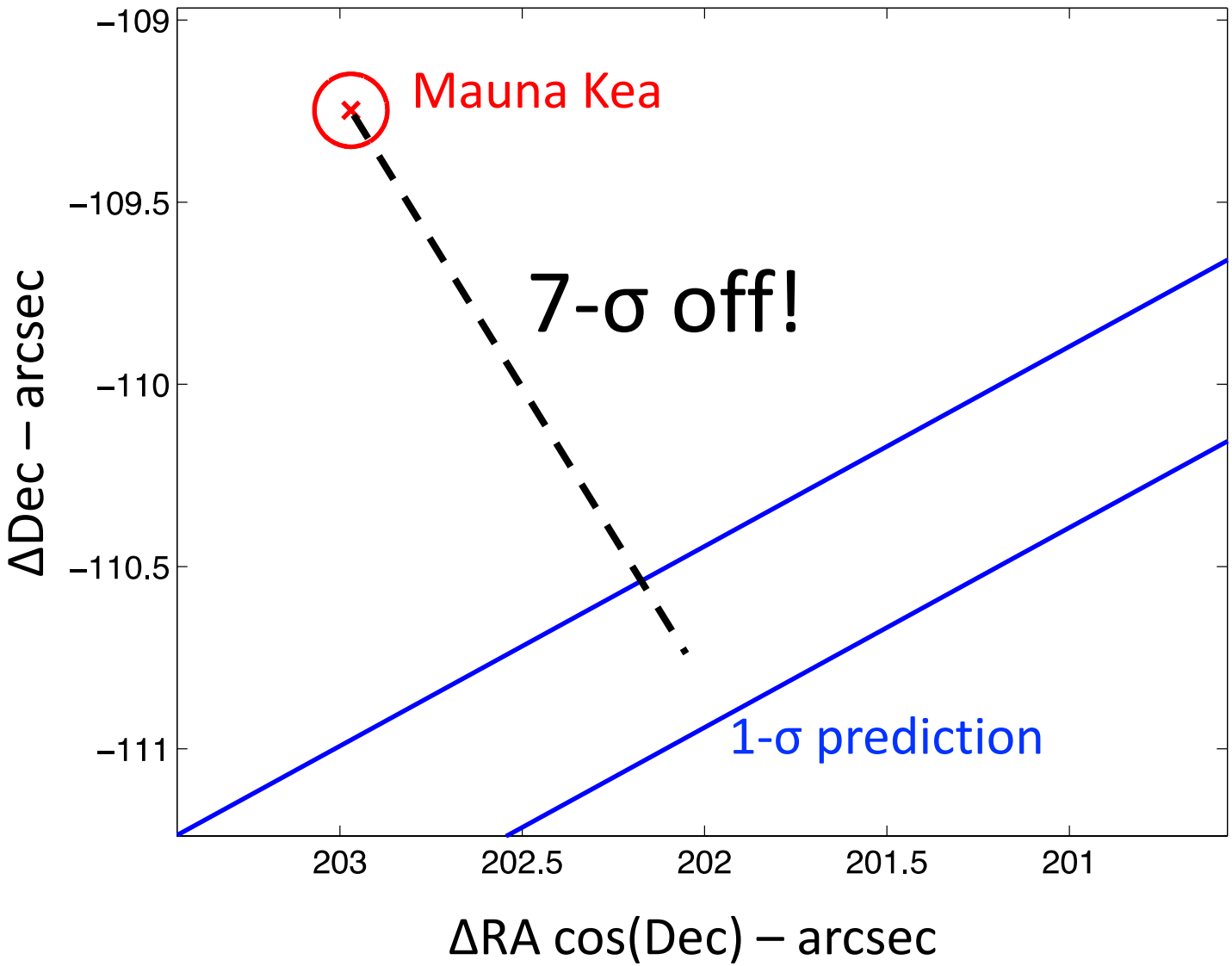
- **Close approach at 0.3 LD**
- **E-type asteroid, albedo ~60%**
- **Diameter ~2 m**
- **Rotation period ~2 min**
- **Potential impacts after 2070**

Credit: Marina Brozovic, NASA/JPL

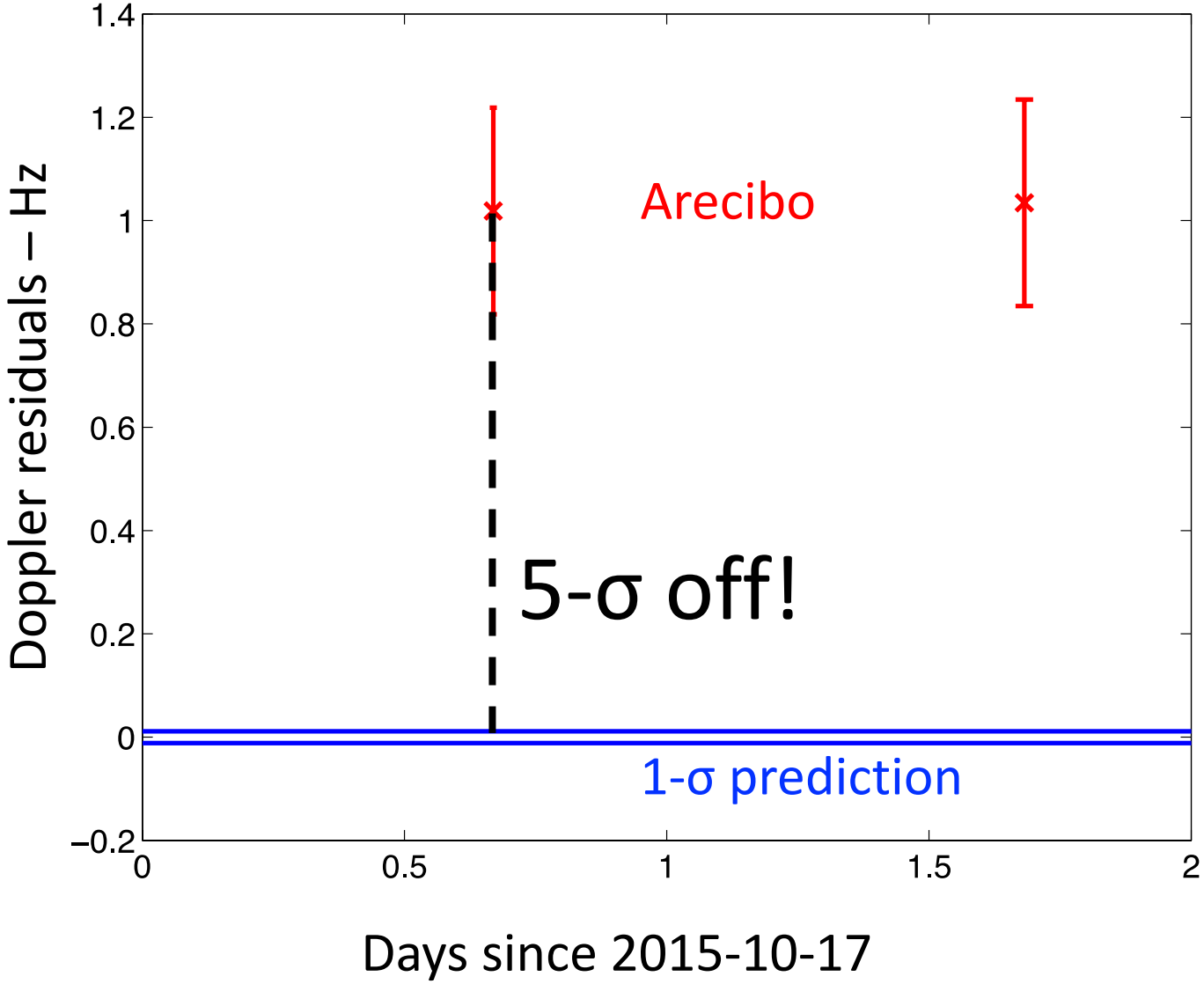
April 2017 recovery



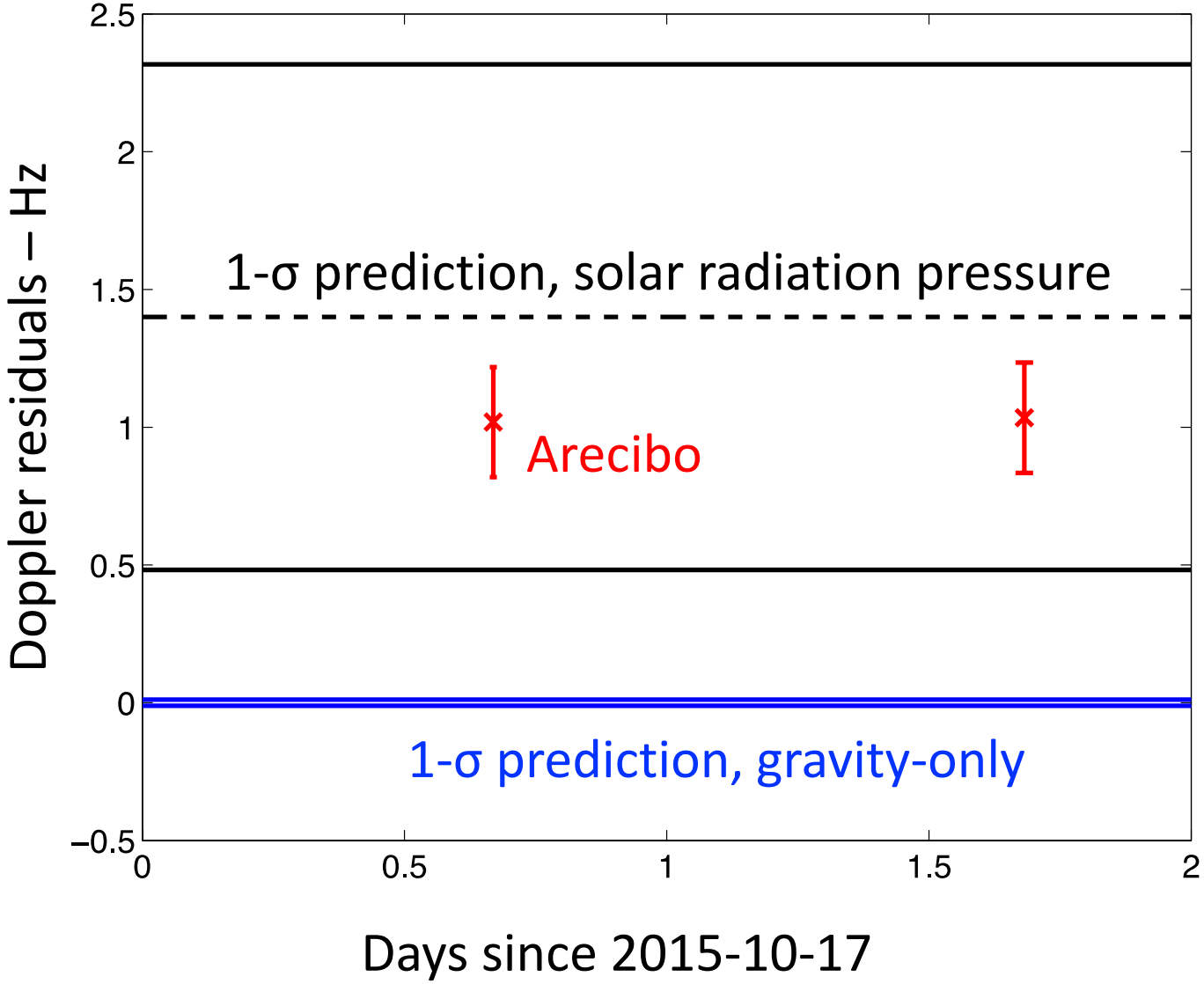
April 2017 recovery



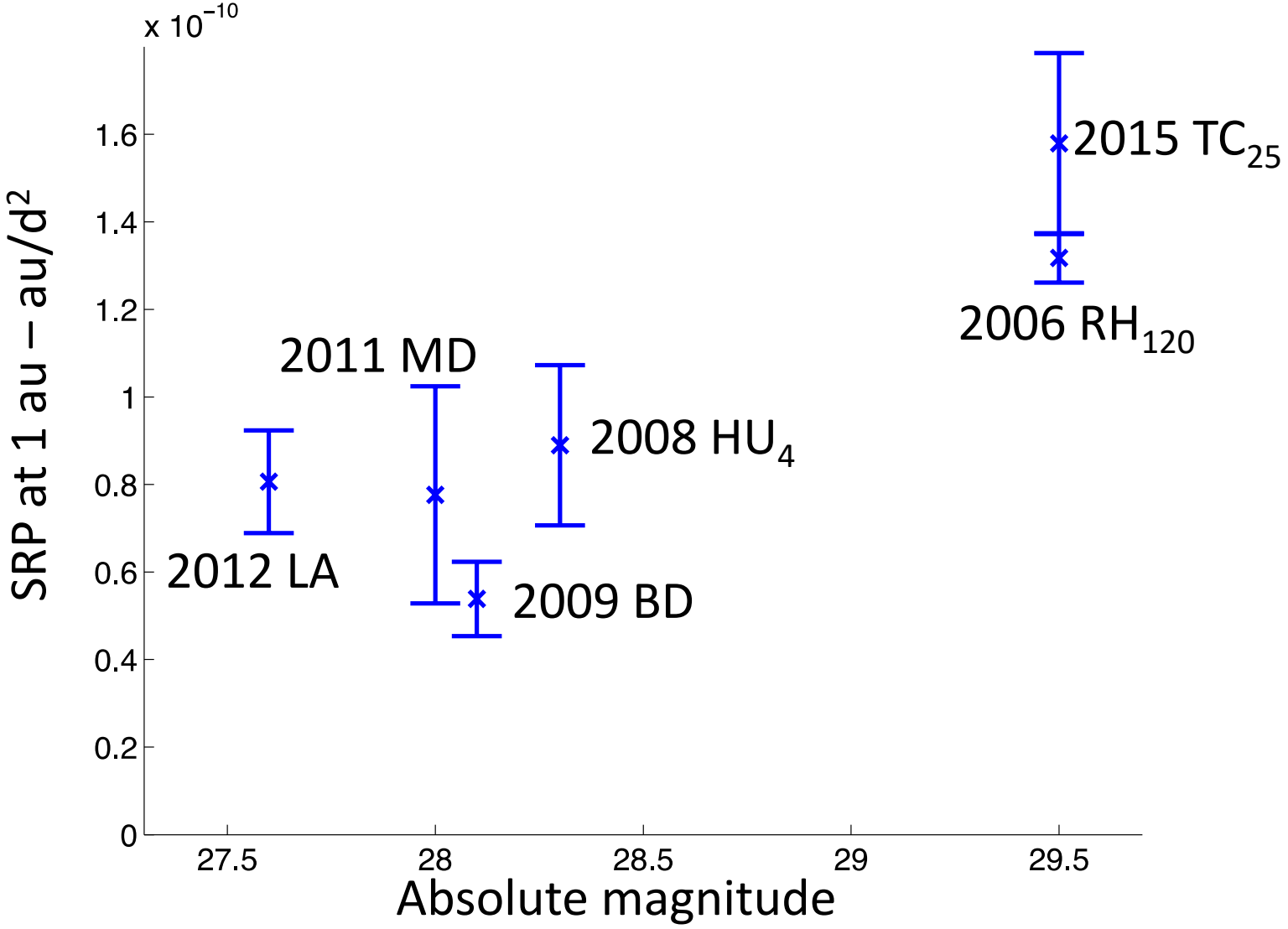
Doppler in 2015



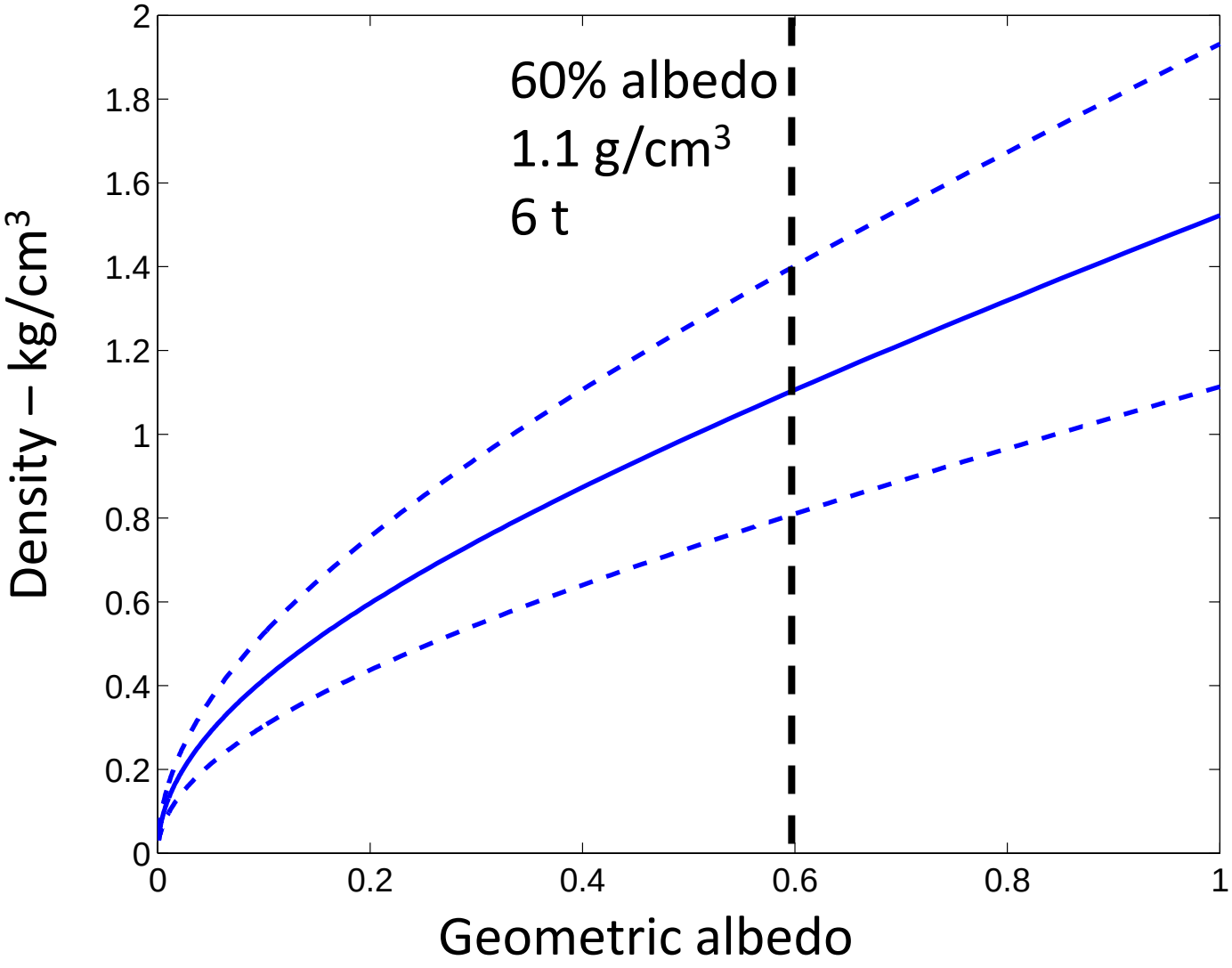
Solar radiation pressure



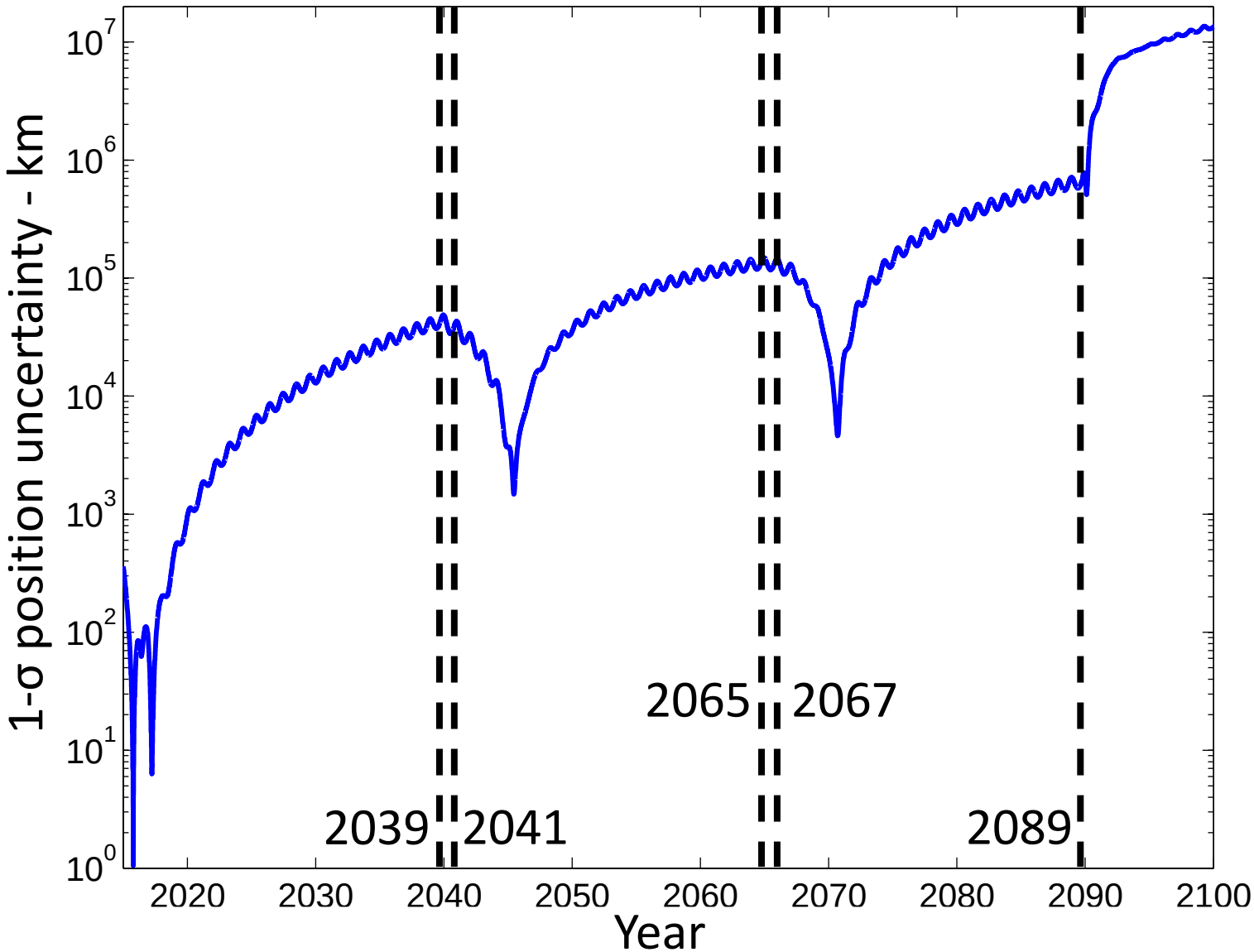
Solar radiation pressure



Density and mass



Future close approaches



Summary

- 7-σ detection of solar radiation pressure for 2015 TC_{25}
- High albedo >50% or low density
- Density of 1.1 ± 0.3 g/cm^3 for a 60% albedo
- Trajectory is deterministic until Earth encounter in Oct 2089
- No impacts for the next 100 years