

Abstract Submitted
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Formation of the Oort Cloud through stellar flybys¹ DIPTAJYOTI MUKHERJEE, Allegheny College, SANTIAGO TORRES, MAXWELL CAI, SIMON PORTEGIES ZWART, Leiden University — Jan H. Oort proposed in 1950 the existence of the cometary cloud that surrounds the Solar System, but its formation mechanism(s) are still unclear. In several studies, it has been argued that the Oort cloud formed shortly after the giant planets formed. The Nice Model, for example, argues that most of debris was ejected into Oort Cloud as a result of a dynamical instability caused due to a 2:1 Mean Motion Resonance between Saturn and Jupiter. It caused Uranus and Neptune to be swept outwards which resulted in a scattering of the disk particles. Approximately 8-12% of this material formed the basis of the Oort Cloud. However, the results suggest that these models are hard to reproduce. They assume that the Sun was formed in an isolated environment. Current theories contend that the Sun was, instead, formed in a cluster of about 2000 stars. In this work, we propose an alternate method for ejecting particles into the Oort Cloud through multiple stellar flybys in an early solar system. Through N-Body simulations, we find that multiple encounters of the Solar system with stars in the star cluster result in an efficient ejection of particles into Oort Cloud. Our process is very reproducible and able to eject particles more efficiently than just planet-disc interactions.

¹Leiden University

Diptajyoti Mukherjee
Allegheny College

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