

## Orbital evolution of planetesimals in the outer planetary system during the growing stage of Saturn

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We investigate the orbital evolution of planetesimals in the protoplanetary disk near the secular resonance with Jupiter during the growing stage of Saturn. We find that the secular resonance pumps up the eccentricities of the planetesimals, which induce radial orbital decay due to gas drag. Taking the growth of Saturn into account, the planetesimals concentrate near 15.2AU (where 1:2 mean-motion resonance with Saturn) and 22.5AU, where Uranus and Neptune were thought to be formed, respectively.