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Wakes induced by small moons in a planetary ring

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S-shaped density structures, called propellers, have been discoverd recently in Saturn's A-ring by the Cassini-ISS cameras (Tiscareno et al. 2006). These structures have been predicted by Spahn and Sremcevic (2000) to be caused by tiny moons (< 100 meter in diameter) embedded in Saturn's rings. This feature reflects the interplay between moonlet gravity and ring-particle collitions. So far, it is not satisfiable explained if the observed pattern represents the two depleted gaps or their adjacent wakes.

Results of local box simulations are presented. We investigate the azimuthal extent of the wake crests for different model parameters, especially its dependence on the moonlet size. The wakes start to damp after around two wake cycles agreeing with the start of streamline crossing in the non-collisional model. We emphasise the differences in the azimuthal scaling behaviour between the wakes and gaps and discuss the results in the context of recent observations.