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The Tidal Streams of Interstellar Objects

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We study the dynamics of interstellar objects (ISOs), which provide samples of the planetesimal formation process taking place across the Galaxy and throughout Galactic history. Once ISOs escape their system of origin, they orbit the Galaxy in leading and trailing tidal streams around their progenitors. We characterize the properties of these streams for a range of progenitors and ejection mechanisms. We find that streams are primarily distinguished by the typical velocity at which the ISOs are ejected from their progenitors, that streams can often wrap around the Galaxy, and that the velocity and density structure of the streams can have a large effect on the rate at which we should expect to observe ISOs in upcoming Solar System surveys.