

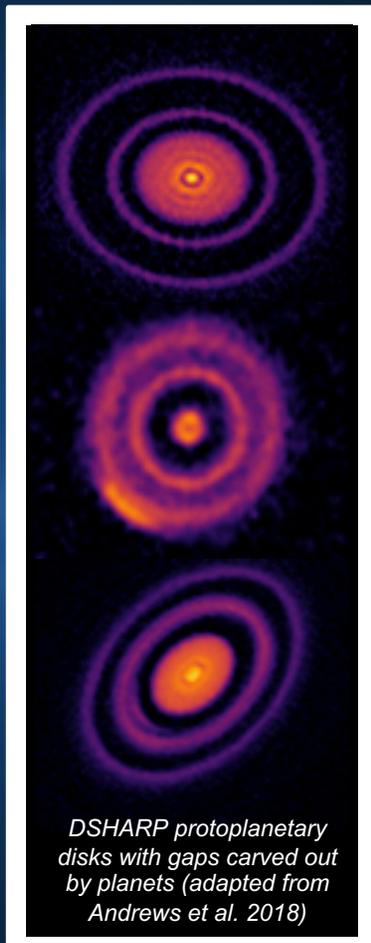
Interstellar Objects and DSHARP Point Towards 100 Billion Hidden Planets



- With the discovery of numerous and diverse exoplanets, the scope of astrobiology has expanded beyond our own solar system. Recent high-resolution protoplanetary disk images from the DSHARP survey suggest that Neptune-sized planets orbiting at large distances from their host stars are common in extrasolar systems.
- These planets efficiently eject small, rocky bodies orbiting nearby in their host disks, producing a high density of interstellar objects free-floating through the Galaxy. 2I/Borisov, the second known interstellar object, has the same properties expected of material ejected early in the solar system's evolution.
- Based on these findings, the Large Survey Synoptic Telescope (LSST), coming online in 2020, should find a few large (>50 m) interstellar objects and up to hundreds of smaller interstellar objects each year. A subset of these interstellar visitors will make compelling targets for low-cost interception missions, and possibly the in-situ astrobiological analysis of exoplanetary material.



Two-color composite image of 2I/Borisov (Gemini Observatory)



DSHARP protoplanetary disks with gaps carved out by planets (adapted from Andrews et al. 2018)