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Disk lifetime of protoplanetary disks surrounding intermediate-mass stars in the inner Galaxy

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Disk lifetime is one of the most important parameters which can control planet formation. The disk lifetime has been estimated by various studies to be ~5–10Myr. However, this value is applicable only to studies for the solar metallicity. For a thorough understanding of planet formation, the disk lifetime should be determined in other (metallicity) environments. This may impose a strong constraint on the disk evolution mechanisms and the planet formation processes.

We previously derived disk fraction in the outer Galaxy (~15 kpc from the center of the Galaxy), which is known to be the low-metallicity environments (~1/10 solar metallicity), and found that disk lifetime is much shorter (~1Myr) than that of the solar metallicity. For the next step, we derived the disk fraction of intermediate-mass stars in the inner Galaxy (~4kpc from the center of the Galaxy), which is a high-metallicity environment (~3x solar metallitity), and found a relatively high disk fraction for a cluster with the age of ~20Myr. This cluster is older than the disk lifetime in solar metallicity clusters, and this suggests that the disk lifetime is much longer in higher metallicity environments. In this talk, I am going to discuss metallicity dependence of disk lifetime in a wide metallicity range from 0.1 to 3 times solar metallicity

Keywords: protoplanetary disk, metallicity, planet formation