Contribution ID: **44** Type: **Contributed talk**

Dark Gamma Ray Bursts

Wednesday, 26 July 2017 16:00 (15 minutes)

Many theories of dark matter (DM) predict that DM particles can be captured by stars via scattering on ordinary matter. They subsequently condense into a DM core close to the center of the star and eventually annihilate. In this work, we trace DM capture and annihilation rates throughout the life of a massive star and show that this evolution culminates in an intense annihilation burst coincident with the death of the star in a core collapse supernova. The reason is that, along with the stellar interior, also its DM core heats up and contracts, so that the DM density increases rapidly during the final stages of stellar evolution. We argue that, counterintuitively, the annihilation burst is more intense if DM annihilation is a p-wave process than for s-wave annihilation because in the former case, more DM particles survive until the supernova. If among the DM annihilation products are particles like dark photons that can escape the exploding star and decay to Standard Model particles later, the annihilation burst results in a flash of gamma rays accompanying the supernova. For a galactic supernova, this "dark gamma ray burst" may be observable in CTA.

Primary authors: Dr LIU, Jia (Johannes Gutenberg University Mainz); KOPP, Joachim (Johannes-Gutenberg-Universitaet Mainz (DE)); BRDAR, Vedran (JGU Mainz)

Presenter: Dr LIU, Jia (Johannes Gutenberg University Mainz)

Session Classification: Dark Matter

Track Classification: Dark Matter