Freshly Condensed Grains in the Dusty Disks of Evolved Main Sequence Be Stars
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Be stars are fast rotating main sequence stars. In addition to their characteristic emission lines in the spectra, they have emission in the infrared wavelengths in excess of the photospheric radition, which can be accounted for by free-free plasma emission. A few Be stars however show very promiment infrared excess that must be explained by thermal dust emission. Unlike Herbig Ae/Be stars, which are pre-main sequence stars with surplus dust from the star-forming process, these "classical" Be stars are believed to be at the verge of turning off the main sequence, so the dust grains should be freshly condensed in their expanding atmosphere. While Herbig Ae/Be stars have large-sized circumstellar dust grains as a result of grain growth in the molecular clouds, classical Be stars may have very tiny, even nanoparticle, grains, which are highly efficient emitters. Our optical and IR observations, including photometric, spectroscopic, and polarimetric measurements, have shown correlation between gas activity and dust emission, and existence of disk-like distribution of circumstellar materials. We will use ALMA to probe any abnormity of the dust grains in the classical Be stars environments, e.g., strong emission by small amounts of dust, or unusual optical emissivity. Some disks may be resolved by ALMA, which will provide clues if the break-up rotation of these stars is linked to their formation and evolution history.

In the summer program, I will be able to advise the student about stellar evolution, dust properties, multi-wavelength observations, etc.