Unique MIR spectral features and dust properties of young AGN

Yanxia Xie(Shanghai Astronomical Observatory, CAS)
Lei Hao(Shanghai Astronomical Observatory, CAS)

We investigate the powering source and dust properties of three unique galaxies which simultaneously show very strong silicate and PAH emissions, together with very low 5-8μm continuum in the mid-infrared. All three galaxies are classified as AGN and starburst composites from optical emission line properties. In mid-infrared, we show that the strong silicate emission can be used to trace warm dust which is excited by the AGN activity. The presence of AGN in the three galaxies is also indicated by PAH ratios and large value of x-ray to far-infrared luminosity. Despite the silicate emissions relate to warm dust, the low 5-8μm continuum reflect cool dust, the presence of the two together seems contradictory to each other. In theoretical dust models, the low 5-8μm continuum can be accounted for by iron-poor dust compositions, larger grain size distributions and lower PAH fractions while silicate emission can remain strong. Two of the three galaxies are members of Lyman Break Analogs (LBA) which are very rare in local universe. These two sources are young, very compact in FUV and optical, having strong outflow and massive dominant central object (DCO). The other galaxy is also unresolved on GALEX NUV image and show younger stellar population. We discuss that young AGN activity in these systems could be the reason for the unique dust properties that may explain the contradictory combination of low 5-8μm continuum and silicate emission of the three galaxies.