

آگهی دفاع دکتری

پژوهشکده نجوم

## بررسی تابش میلیمتری در کهکشان‌های نزدیک

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### **Abstract:**

Dust plays a crucial role in the interstellar medium of galaxies, influencing their thermal, chemical, and radiative properties. It absorbs and scatters starlight, leading to extinction and reddening effects, and re-emits the absorbed energy in the far-infrared. Dust also cools the interstellar medium by emitting radiation in infrared and submillimeter wavelengths and acts as a catalyst for molecular hydrogen formation, essential for star formation. The IMEGIN project (Interpreting Millimeter Emission of Galaxies with IRAM and NIKA2) leverages the NIKA2 camera on the IRAM 30m telescope to explore millimeter properties of galaxies, focusing on dust emission beyond  $500 \mu\text{m}$  to detect cold dust components. This project, led by Dr. Suzanne Madden and involving 14 European institutes in addition to IPM from Iran, aims to disentangle contributions from dust, synchrotron, and free-free emissions. High spatial resolution maps of these emissions will advance our understanding of star formation and dust evolution in galaxies. We utilized multi-wavelength data from Herschel, Spitzer, and Planck in infrared and submillimeter, and from VLA, Effelsberg and WSRT in radio regime to complement NIKA2 observations, constructing detailed spectral energy distributions (SEDs) for a diverse sample of galaxies. This enables the separation of different emission components and derivation of key physical parameters such as dust temperature, mass, and composition. We investigated the relationship between dust properties and galactic characteristics like star formation rate, and morphology, providing insights into dust evolution and galaxy evolution. We also suggest millimeter emission as a powerful extinction-free tracer of molecular gas across various galactic environments.