**Progetto di Ricerca e Piano di Attività**

**Constraining galaxy evolution with infrared and sub-mm/radio observations**

The successful applicant will work at DIFA within the stimulating environment of the *Navile Campus* in Bologna, the largest cluster of institutes for astrophysical research in Italy (DIFA, INAF-OAS, INAF-IRA, ALMA Regional Center, and the headquarters of the Cherenkov Telescope Array).

The research project will be focused on the study of the physics and evolution of high-redshift galaxies through the exploitation of data collected in the infrared–radio spectral range (e.g. Herschel, ALMA, NOEMA, OST, LMT, VLA). The main goals of the project will be:

**(i)** the evolution of the cosmic star formation density including the elusive component obscured by dust extinction,

**(ii)** the evolution of gas and dust across cosmic times,

**(iii)** the study of the progenitors of present-day massive galaxies,

**(iv)** the clustering of different galaxy populations and their links with dark matter halos,

**(v)** the co-evolution of galaxies and AGNs in the critical cosmic epoch during which it is thought that the active nucleus influenced the host galaxy through feedback processes leading to the rapid suppression of the star formation,

**(vi)** the comparison with the predictions of state-of-the-art galaxy formation models.

This project will allow us to build a comprehensive picture of the *baryon cycle* and the physical processes regulating the star formation and stellar mass assembly in high-z galaxies. The exploitation of multi-wavelength datasets will be essential for the success of these studies. Moreover, the postdoctoral fellow will be involved in the study of the synergies with future space missions such as Euclid and SPICA (where DIFA is involved with roles of top-level scientific and management responsibilities), as well as with JWST and SKA.

The development of this research project will allow the research fellow to achieve an extended experience in the most modern methods of cosmological and astrophysical investigation. Moreover, the combination of both observational and theoretical aspects will allow the research fellow to grow the scientific expertise in a complete way, thus opening several opportunities of a successful career in the cosmology and astrophysics research.