A Comprehensive Redshift Survey of the Brightest Herschel Galaxies

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Abstract: The Herschel surveys have enabled the detection of numerous dusty luminous sub-millimeter galaxies (SMGs) in the early universe. Follow-up observations of these sources are essential to determine their nature and the physical properties of their interstellar medium; reliable measurements of their redshifts are therefore crucial to explore the molecular and atomic gas of these objects. We will here present the results of an on-going Large Program, *z*-GAL, using NOEMA, aimed at a comprehensive 3 and 2-mm spectroscopic redshift survey of a large (~150 sources) sample of the brightest ($S_{500\ \mu m}$>80 mJy) SMGs selected from the Herschel H-ATLAS and HerMES surveys, which probe the peak of cosmic evolution (2<z<4). The results highlight the nature of the sources, lenses and the rare hyper-luminous galaxies, as well as, in some cases, their multiplicity. We will describe the current status of the survey and complementary data, including HST data, and outline future prospects.