

## **Seminarium Astrofizyczne**

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**Lingyu Wang**

(SRON, Netherlands)

### **The nature of hyperluminous infrared galaxies**

A key discovery from the Infrared Astronomical Satellite (IRAS) was the existence of dusty galaxies with remarkably high infrared (IR) luminosity  $L_{IR}$  (integrated between 8 and 1000  $\mu m$ ). The most extreme kind are what's known as hyperluminous infrared galaxies (which emit over 90% of their energy in the IR) with IR luminosities greater than  $10^{13} L_{solar}$ . If the IR luminosity is solely due to star formation, the star-formation rate of HLIRGs would exceed 1000  $M_{solar}/yr$ . Past studies of HLIRGs show evidence of active galactic nucleus (AGN) dust torus emission, but the far-IR (FIR) and sub-millimetre (sub-mm) emission is usually driven by star formation. With the Herschel observatory, we have seen a large population of HLIRGs with a space density much higher than what models of galaxy evolution could predict, highlighting a missing piece in our understanding of the formation and evolution of massive galaxies. Unfortunately Herschel's spatial resolution is too poor which led to many uncertainties regarding the basic properties of the HLIRG population. Thanks to the deep LOFAR surveys, we are now able to provide the most accurate estimate yet of the abundance of HLIRGs which is over an order of magnitude more than predictions from theoretical models, thanks to the combination of the high sensitivity, angular resolution, and large area of the LOFAR Deep Fields. The precise positions from LOFAR observations also allow us to find unambiguous multi-wavelength matches of the HLIRGs and therefore study physical properties such as star-formation rate, AGN fraction etc.

Serdecznie zapraszam,

Agnieszka Majczyna