Gas flows and starburst in merging dwarf galaxies

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Dwarf galaxies ($M_* = 10^{2-9}$ M$_\odot$) take up to 80 per cent of the galaxies in our local volume and are therefore highly abundant in the Universe. Additionally, dwarf galaxies typically have low metallicities and are therefore often thought to be similar to the earliest galaxies in the Universe. Due to their low mass and shallow potential wells, dwarf galaxies are highly susceptible to the effects of their own star formation and resulting feedback processes. Furthermore, structure formation in the Universe is believed to be hierarchical, meaning that smaller structures form first. This leads to mergers of smaller galaxies as they gradually build-up larger galaxies. The above reasons are a few examples as to why dwarf galaxies make a great research ground for high resolution simulations and research regarding star formation and galactic evolution.

The aim of the seminar is to present our research regarding radial gas flows, star formation and stellar feedback, induced by the interaction of a minor 10:1 merger of two dwarf galaxies. The research is conducted using the high-resolution hydrodynamical simulation code GRIFFIN. In addition to the merger setup, we run the simulation on an isolated galaxy (i.e. no merger interaction), in order to perform a comparative analysis and quantify the physical differences between the merger and the isolated galaxy.

We find that the merger interaction leads to massive gas inflows in the bigger galaxy of the merger system, subsequently increasing the gas densities in the centre of the galaxy. This triggers a starburst, a period of increased star formation, in the merger galaxy that is not seen in the isolated galaxy. The starburst leads to the formation of star clusters that are eventually able to drive massive gas outflows as a result of clustered supernova explosions. Therefore, our research provides concrete insight as to how galaxy mergers shape the evolution of low-mass galaxies, and subsequently the evolution of large scale structure in the Universe.