

# Super star clusters and their emission lines

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**Abstract.** Super star clusters (SSCs) are young massive objects typically observed in starburst galaxies. They consist of millions of stars occupying volumes only several parsecs across. Recent infrared observations of SSCs reveal strong emission lines with moderately supersonic widths (FWHM  $\sim 50-100$  km s<sup>-1</sup>). An additional, much broader and weaker line component is present in some cases. Using 2D and 3D hydrodynamic simulations, we study models of SSCs in the so-called *bimodal regime*, which occurs if the stellar density inside the cluster exceeds a certain limit. We confirm the existence of the bimodal solution predicted analytically and suggest an explanation for double-component line profiles: the narrow component is formed close to the cluster center by *repressurizing shocks* compressing the rarefied gas cooled down due to the thermal instability into dense cold clumps, while the broad component is created by the wind, which cools down at a certain distance from the cluster.

**Keywords.** galaxies: star clusters, HII regions, ISM: bubbles, ISM: lines and bands, hydrodynamics

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