TITLE: The role played by interactions in the assembly of active colloids

ABSTRACT:

Active matter systems are composed of constituents that consume energy in order to move or exert mechanical forces, constantly driving themselves away from equilibrium [1]. Examples of active particles are living, such as bacteria, or artificial, such as active colloids [2,3].
Experiments on spherical man-made self-propelled colloids have shown that active particles present interesting emergent collective properties [4–6], such as motility-induced phase separation (MIPS), involving spontaneous assembly of particles due to the persistence of their direction of motion [7]. An example of colloids undergoing MIPS under suitable conditions are Active Brownian Particles (ABP), i.e. self-propelled Brownian particles interacting with each other via a purely repulsive potential [8].

In order to design novel functional materials, one might need to gain control on the self-assembly process of active colloids.
With this goal in mind, we have explored the competition between activity and a broad range of interactions between active colloids, ranging from isotropic (strongly repulsive [9,15,17], attractive [10,11], micelle-inducing [12]) to anisotropic (Janus-like [13]), unravelling the relevance of hydrodynamics [11,14,16].

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