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Phase separation in binary complex plasmas ALEXEI IVLEV, ADAM WYSOCKI, CHRISTOPH RAETH, ROBERT SUETTERLIN, HUBERTUS THOMAS, GLENN JOYCE, HARTMUT LOEWEN, GREGOR MORFILL, MAX PLANCK INSTITUTE FOR EXTRATERRESTRIAL PHYSICS, 85741 GARCHING, GERMANY TEAM, HEINRICH-HEINE-UNIVERSITAET, 40225 DUESSELDORF, GERMANY COLLABORATION, ICARUS RESEARCH INC., BETHESDA, USA COLLABORATION — Complex plasmas are composed of a weakly ionized gas and charged microparticles and represent an ideal system to investigate multicomponent mixtures. Microparticles usually acquire high negative charges determined by the balance of absorption of the surrounding electrons and ions, and interact via the Yukawa potential. The effective screening length characterizing the interactions is typically two orders of magnitude larger than the particle size, and can be varied from a few tenths to a few interparticle distances. This allows us to span the interaction regimes from short-range to many-body. Recent experiments performed with binary complex plasma under microgravity conditions onboard the ISS revealed different regimes of the phase separation. The interparticle interactions in complex plasmas are characterized by a positive nonadditivity which always stimulates the phase separation. For typical experimental conditions the regime of the spinodal decomposition is easily achievable.

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