Intracluster light in the Euclid and JWST era

The intracluster light (ICL) of galaxy clusters, a low surface brightness (LSB) glow emanating from free floating stars not bound to any galaxy in particular, is receiving an increasing amount of attention from the scientific community. The origin and quantity of these stars, as well as the physical mechanisms behind their current dynamical state hold critical information about the past history of galaxy clusters, and provide new diagnostics about their evolution. The pace of observations is accelerating with a new generation of instrumentation (e.g. JWST, Euclid, Vera Rubin, Roman Observatories) that will provide broad-band optical and/or near-infrared colors for almost all galaxy clusters in the observable Universe over at least the last 10 billion years of history. Notably, the ESA Euclid space telescope will survey 15000 deg of the extragalactic sky, a mission primarily designed to improve the figure of merit of cosmological probes but which shows an astounding potential for LSB studies as demonstrated by the Early Release Observations of the Perseus, Fornax, A2390 and A2764 clusters. In parallel, the JWST provides an order of magnitude improvement in sensitivity in the IR and represents a vivid jump in our efforts toward probing galaxy clusters and the distant Universe, as shown by the first JWST release of SMACS J0723.3-7323 at z=0.39. The combination of these pristine and complementary datasets will allow us to reach deeper layers of galaxy cluster sciences, in terms of redshift, of photometric depths and of statistics. Though, these advancements are also unveiling unprecedented contamination by faint foreground Galactic Cirrus, imposing new methodological challenges to reach the extragalactic signal of interest.