[02/11/2015 - 15:35 - Room Vitória]

Cell sorting with variable cluster size: a Smoluchowski equation approach, CARINE PRISCILA BEATRICI, RITA MARIA CUNHA DE ALMEIDA, LEONARDO GREGORY BRUNNET, *IF-UFRGS* ■Cell segregation is an widespread phenomena in nature and has interested physicists since the last 50 years. It opens the possibility of studying a system composed of many interacting active identical elements, both theoretically and experimentally. A typical cell sorting experiment measures the evolution of clusters sizes, or also the size of the interface between the two tissues at stake. The dynamics underlying cell migration drives the cell segregation, which is directly related to cluster formation, where the endoderm cells attach each other forming groups. This development evolves through cluster diffusion and depends on cluster cross section and cell affinity. In the context of active media cluster growth may present unexpected exponents when compared to non-active matter. When clusters are formed by inert particles it is expected that the diffusion scales inversely with the cluster mass, in the case of active matter that does not hold and this is central to define the segregation time scales. Also, finite size effects are important since they impose deviation from power law solutions. To approach this problem from a theoretical point of view we use the Smoluchowski fragmentation-coagulation equation with an adapted coagulation kernel and a fragmentation kernel. It is found that the underlying growth power laws may be hidden depending on initial cluster sizes, sample size and fragmentation constant. The average cluster size solutions found with the Smoluchowski equation are used to fit the data resulting from the simulations and the power law behavior can be clearly separated out of the minimum and maximum cluster size limits.