ASG “Statistical Physics of Collective Motion”
Focus Workshop “Connecting theory and experiments in active matter”, June 5-7, 2013
Scientific report

Organizers: Hugues Chaté, Karsten Kruse, Sriram Ramaswamy

Final attendance: around 40 participants, including about 12 from the biophysics division of PKS

Main focus of workshop:

In active matter studies, collective motion occupies an important place. To a large extent, and notably thanks to the ASG and related events, theory is now “ahead” of experiments and thus in crucial need of confrontation to them. This situation largely arises from the difficulties of setting up controlled, quantitative, experiments / observations on animal groups and *in vivo* biological situations.

In this context, the remarkable i*n vitro* experiments performed recently using purified proteins are an exception. These assays are of great values for the theorists, but they nevertheless retain some relevance to *in vivo* situations.

The workshop has been a wonderful opportunity to bring together the main players in this context: the theorists at the origin of most of the recent advances in the field, and most of the researchers already performing in vitro experiments using bio-components.

Format of workshop:

The initial plan to have a relatively small workshop where everybody would sit around the same table was maintained, in spite of logistic problems due to the unannounced participation of a fairly large group of people from the biophysics division of PKS. This setting, and the long discussion periods scheduled with each talk, did facilitate exchanges of frequency and spontaneity seldom seen in larger events.

Remarkable talks and participants, newcomers:

It is fair to say that the most noted and applauded talks were given by the experimentalists: K. Oiwa, Z. Dogic, A. Bausch, M. Murrell, and L. Blanchoin delivered remarkable talks during which they impressed the audience by the quality and novelty of their results obtained on relatively well-controlled systems of biofilaments, motor proteins, and various polymers/crosslinkers. The general consensus after that was that indeed we can look forward to tremendous progress in our understanding of active matter in the next few years thanks to this sort of experiments.

Also notable has been the update about our understanding of the actin cortex in cells, in particular thanks to the talks of F. MacKintosh, G. Koenderink, C. Sykes, C. Schmidt, A. Bernheim, and S. Grill, and the interactions with the theorists in the room.

Among the above people, L. Blanchoin, Z. Dogic, and M. Murrell, were all “newcomers” and were clearly very well regarded by others. They also said that they were very

happy to have been invited. Everybody was impressed by the quality of the work of these young researchers.

Interactions with theorists:

With, in particular, J. Toner, F. MacKintosh, J. Prost and JF. Joanny in the room, there were lively debates and many questions in the room. We could not avoid that the discussion sometimes went into important but rather technical issues!

General outcome, perspectives:

There was general a posteriori consensus that the workshop was timely and fruitful: again, we now expect strong development in the area of controlled active matter experiments using bio-components, with particularly strong interactions between theory and experiments. Our opinion is that the near future will see more events organized on this topic.

Regarding the “focus” format of the workshop, participants found it refreshing, nicely different from the usual bigger conferences where they often meet each other. It is our opinion that such smaller-scale events should be encouraged as they provide rare opportunities for high-frequency interactions in an informal-enough setting so that one can go to the heart of the problems.