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Evolving antibody repertoire to vaccine and virus

Clusters of replicating B cells diversify and compete fiercely for survival upon engagement with antigen. Fast evolving pathogens (notably HIV) challenge natural immunity and vaccine design alike; a protective vaccine requires eliciting broadly neutralizing antibodies (bnAbs) capable of recognizing past and novel antigen variants. However, in natural settings, bnAbs develop extremely rarely and slowly. A major gap in understanding remains between activation of bnAb precursors and completion of maturation. In this talk, I discuss our recent attempts to address this gap using statistical physics based models and cross-scale numerical realizations. I will show that using different spaces and representations of the immune-pathogen interactions could reveal new factors that shape co-evolutionary dynamics, suggesting novel paths to broad reactivity.

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University of Cologne

Institute for Theoretical Physics

Seminar Room 0.02, Ground Floor

Hosted by Michael Lässig