Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Scaling exponents report on changes in the mechanism of filamentous growth LUKE RAJAH, SAMUEL COHEN, Department of Chemistry, University of Cambridge, SARA LINSE, ERIK HELLSTRAND, Chemistry Department and Molecular Protein Science, Lund University, CHRIS DOBSON, TUOMAS KNOWLES, Department of Chemistry, University of Cambridge — We analyse the scaling behaviour in the proliferation and growth of protein nanostructures. We show that changes in scaling exponents that govern the lag time of the reaction within a given system can be identified with mechanistic changes that affect a molecular step in the assembly pathway. In this study, we focused on fibril growth from a representative protein, insulin, and an unstructured peptide, Aβ42. Our results reveal that the scaling exponent contains contributions not only from the dominant secondary nucleation mechanism in the systems studied, but also from the primary nucleation step even in cases where the generation of nuclei from the primary pathway is significantly smaller than from the secondary pathway. These results shed light on the origin of the scaling behaviour of filamentous growth.

Luke Rajah
Department of Chemistry, University of Cambridge

Date submitted: 11 Nov 2011 Electronic form version 1.4