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Phase Diagram for a Model of Truncated βB1-Crystallin THIENBAO NGUYEN, JAMES GUNTON, Lehigh University Physics — βB1-Crystallin proteins, found in the eye lens, self assemble into various oligomer sizes that can affect transparency and refractive power of the lens. Knowing the phase diagrams is an important aspect of understanding this self-assembly. There exists an experimental measurement of the effect of truncation of the protein's N-terminus, which has been associated with aging, on the self-assembly and phase transition properties of the protein solution. By studying the behavior of a native state βB1 and a truncated version, it was found that the protein undergoes two interesting phase transitions. The first transition corresponds to the fluid-solid solubility line, below which is found rod like structures that crystallize over time. Further below the solubility line is the second transition, which is a liquid-liquid phase separation accompanied by by gelation of the protein rich phase. We propose a phenomenological coarse-grained model, and use a Monte Carlo method simulation to determine the phase transition with the goal of explaining the solubility line and found self-assembly structures in the experimental work.

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