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Para-, ferro- and antiferro-magnetic order in beta-sheet tapes of oligopeptides[1] SARA JABBARI-FAROUJI, PAUL VAN DER SCHOOT, Eindhoven University of Technology — Beta-sheet-forming peptides give rise to self-assembled hierarchical structures such as tapes, ribbons and fibrils, which at sufficiently high concentrations form nematic liquid crystalline solutions and gels. Applications of these novel materials are found in nanotechnology, medicine and personal care products. Such aggregates not only appear in the context of desirable biomaterials but also in pathological self-assembly of mis-folded proteins, forming aggregates such as "amyloids". Recently a theoretical model was developed to understand the properties of these self-assembling structures [1]. The question which arises is what happens if we mix different peptide species varying e.g. in length or interaction energy. Do they mix in self-assembled structures or form separate ones? This is of crucial importance as most of industrially produced materials are not monodisperse. To model the simplest polydisperse system, we apply two-component self-assembled Ising model, in which three energy scales are involved. We show that depending upon the relative values of these energy scales and concentrations of the two components, different morphologies of tapes consisting of both components are formed exhibiting paramagnetic, ferromagnetic or antiferromagnetic order. [1] A. Aggeli, et al; PNAS **2001,** 98, 11857

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