



Supplementary Figure 1. EPR spectra for ‘spin-diluted’ D178N huPrP90-231 fibrils, formed with a 1:4 ratio of labeled to unlabeled protein. Such spin dilution effectively removes any distance-dependent internitroxide interactions, and the resultant spectra reflect the motional properties of individual spin labels at the indicated positions. EPR signals are shown for amyloid fibrils formed under denaturing (rPrP<sup>AmU</sup>, black line), and native conditions (rPrP<sup>AmN</sup>, red line). The sites of nitroxide attachment are indicated by residue number for each pair of spectra. Scan width is 200 G and spectral pairs for each position are scaled to the same number of spins.