

## Movie Legends

**Movie S1. The structures of the P22, CUS-3, and Sf6 I-domains.** The closest to the mean NMR structures showing the six-stranded anti-parallel  $\beta$ -barrel motif in blue, and the accessory sub-domains consisting of 3  $\beta$ -strands and a 1.5 turn  $\alpha$ -helix in orange and magenta, respectively. The two additional  $\beta$ -strands that cross over the top of the six-stranded  $\beta$ -barrel in Sf6 are colored in green. The simultaneous rotation of the three I-domains highlights the structural differences at the periphery of the  $\beta$ -barrel.

**Movie S2. The charge of the docking surface of the I-domains is not conserved.** Electrostatic surface potentials at the interface of the P22, CUS-3 and Sf6 I-domains and their coat protein core are shown. The I-domains and coat protein cores are separated and slightly rotated to show the lack of conservation between the interfaces surface potentials. Electrostatic surfaces were calculated on a scale from -10 to +10 kcal/mol\*e with the APBS program.