**Movie legends**

Movie 1. Crop of a raw image stack after X-ray correction (80 tilted views, from -59° to +62°). Note the low contrast of the microtubules (protein is dark) in these low electron dose images. Gold particles functionalized with cationic BSA have been added to the specimen to help tracking during acquisition and registering of the images before 3D reconstruction.

Movie 2. Bead model showing the distribution of gold particles functionalized with anionic BSA at the two air-water interfaces. The thickness of the ice layer is ~70 nm.

Movie 3. Raw image stack after alignment. Most of the beads have been erased. The image stack has been rotated so that the tilt axis is now vertical.

Movie 4. Crop of a tomogram showing microtubules in interaction with XMAP215. The contrast has been inverted with respect to the original images so that protein is represented in white. Note the gold particles at the end of the tomogram (in black) that have been masked, and ice contaminants (large white structures) that sit on top of the ice layer.

Movie 5. Tomogram visualized in UCSF Chimera software showing the data as densities (raw data), after automatic segmentation (segmented volume), and colored (XMAP215) to show a microtubule in blue and XMAP215 molecules in red.