Supporting Information

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SI Text

Ring-like artifacts due to grating imperfections. A careful study of the reconstructed images reveals that the reverse projection (RP) protocol imposes more stringent requirements on gratings, i.e., it needs better full-field uniformity and lower local grating imperfections than gratings suitable for the phase stepping (PS) method. In particular, imperfections may induce small ring-like artifacts in the RS-reconstructed slices, which are less evident or missing in PS reconstructions.

Ring artifacts are clearly visible in Fig. S1 for both coronal (*B1*) and sagittal (*B2*) cuts. Due to the averaging effect associated to the phase stepping extraction, the PS protocol is significantly less sensitive to grating defects, and therefore the ring artifacts are less pronounced (see Fig. S1 *A1–2*).

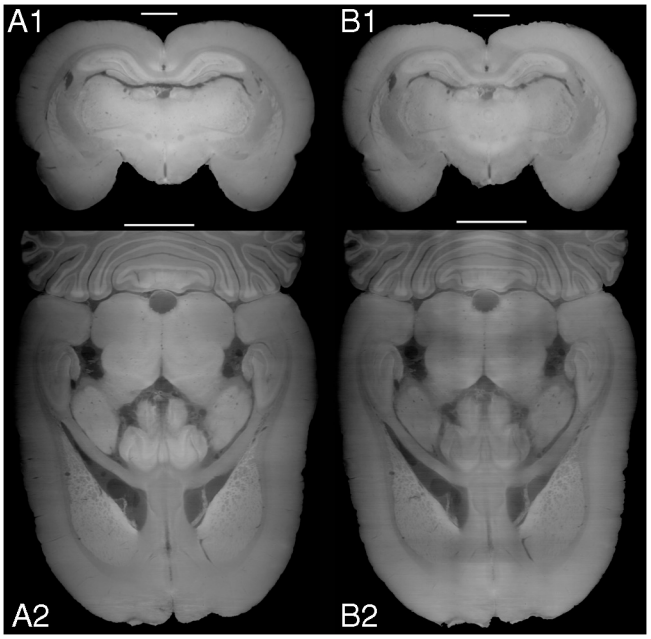

Fig. S1. Tomographic reconstruction of a rat brain. (*A1–2*) Obtained with the PS protocol, (*B1–2*) obtained with the RP protocol using Eq. **11** to calculate the map of the index of refraction. Scale bar, 1 mm (*A1*, *B1*) and 2 mm (*A2*, *B2*).