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Supporting information for article:

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SUPPLEMENTARY MATERIAL

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1. Best reconstruction as a function of the number of projections

Fig. S1 shows the reconstruction with the lowest error as a function of the number of projections considered in this work. For each reconstruction, the spherical coordinates of the spatially resolved magnetization vector are shown separately, *i.e.*, modulus, in-plane (IP) and out-of plane (OOP) angles. Big changes are clearly observed when increasing from 3 to 4 projections in all three spherical components, specifically, the ring's surface is significantly increased and the OOP angle's sign is changed. Relative changes become smaller upon further increasing the number of projections, as the ring's surface continues to grow and finer magnetic texture is resolved evidenced in the OOP component, converging to the reconstruction shown in the main text with 8 projections.
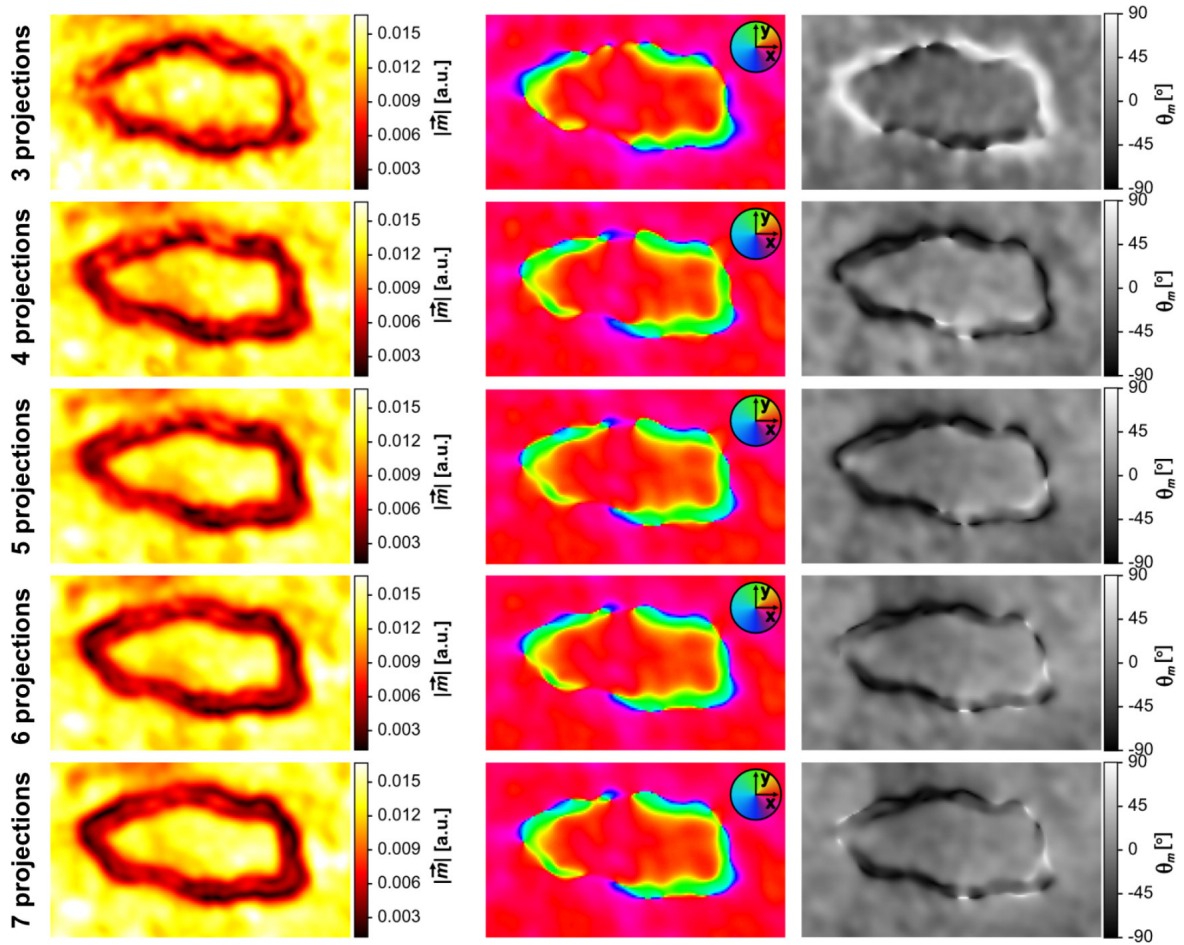
Fig. S1. Best reconstructions for different number of projections specified by the labels on the left. From left-to-right at each row: spatially resolved modulus, IP magnetization direction in *hsv* colormap and OOP component angle measured with respect to the plane of the film.