The self-reconstruction and the propagation stability of Bessel beams have been shown to be of great advantage in light-sheet based microscopy [1-3]. Not only do these beams exhibit an enhanced penetration depth compared to Gaussian beams of the same nominal depth of field, they also possess an increased robustness to scattering artifacts [4]. These benefits however come at the price of a relatively broad ring system surrounding the main maximum of the beam, which becomes even more prominent as the beam is scanned across the sample. This reduces the optical sectioning capability of a light-sheet microscope and leads to a decrease in image contrast. The main challenge in light sheet microscopy with self-reconstructing beams (MISERB) is thus to reduce the influence of the Bessel beam’s ring system on image formation. In this talk we will present an approach that uses a combination of two self-reconstructing beams for the creation of a very thin background-reduced light sheet by exploiting the principles of stimulated emission depletion (STED) microscopy [5]. We will discuss the choice of suitable illumination beams, the expected potential of this new setup in dependence of the scattering induced wavefront deformation and first experimental results obtained with such a STED-MISERB microscope.