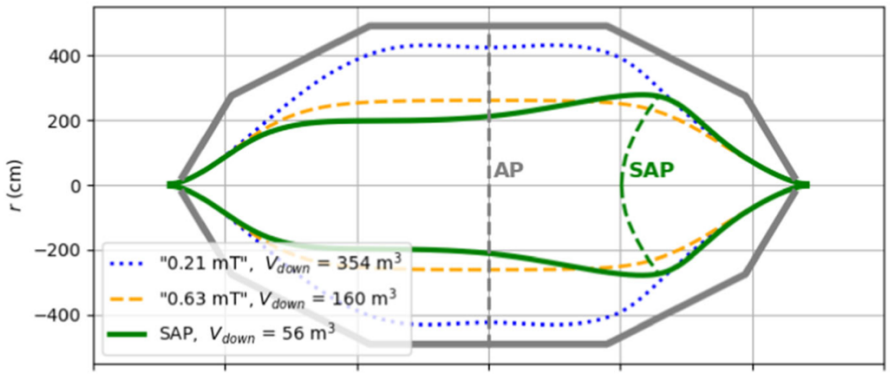
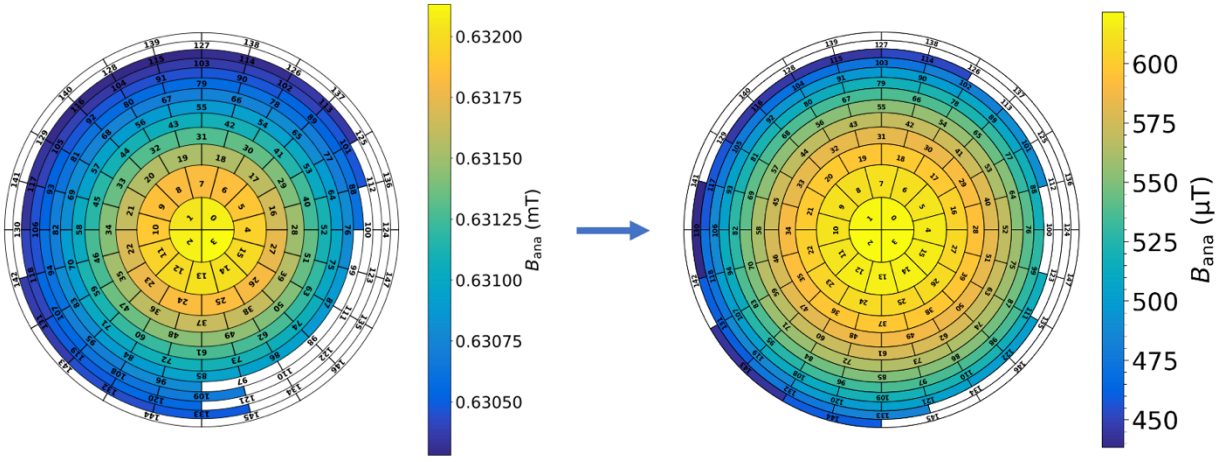
# The shifted analyzing plane (SAP)

A main background source of the KATRIN experiment comes from Rydberg electrons, with a starting energy of $\mathcal{O}$(meV). Those electrons created in the downstream part after the analyzing plane in the main spectrometer are guided by the electric field towards the detector. Such a volume-dependent background component can be suppressed by shifting the analyzing plane, as shown below:




With the shifted analyzing plane configuration, the overall background rate has been reduced by a factor of two. However, this also increases the radial inhomogeneity of the magnetic field at the analyzing plane. Instead of using a uniform model for all detector pixels in the nominal configuration, in the SAP setup the detector pixels are grouped into 14 patches with their own response model, making the model computation more challenging.




Reference:

A. Lokhov, *et al.*, *Eur. Phys. J. C* 82, 258 (2022).