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Towards systematic dosimetry on SOLEIL's Proxima 2A beamline

Every MX experiment could be viewed as (component of) a radiation damage study. To make any conclusions of such a study quantitative one needs to know two things: the beam and the sample. Neither of the two is easy. But the second one is significantly more difficult than the first.

By knowing the beam we mean to know the number, energy, spatial distribution and direction of photons interacting with the sample.

Here we present systematic evaluation of the influence of components of the beamline on resulting photon flux and their distribution at the sample position. We present the model predicting those values for any supported beamline optical configuration. We also present how we went about implementing the possibility to perform on-line measurement of those basic quantities in case of need to check predicted values.

By knowing the sample we mean knowing the chemical composition, spatial distribution and orientation with respect to the beam of the crystal, enclosing mother liquor and the holder.

We present various methods we made available to our users to determine some of those parameters at different levels of detail using a combination of x-ray diffraction based and optical methods. In particular we present a method for building a rough 3d model of sample environment using user input during optical sample alignment and a straightforward method for estimation of sample shape estimation from x-ray based alignment.

We also present implementation of the above developments in the experiment control interface.

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