A modular approach to data reduction

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Data correction remains one of the more challenging aspects of small-angle scattering, in part due to a lack of consistency in the approaches. Recently, a comprehensive summary of data correction steps has been written (for X-ray scattering, but likely also covering the majority of neutron small-angle scattering corrections), detailing for each correction not only the data correction adjustment but also the uncertainty propagation [1]. The explicit separation of corrections in that summary encourages the implementation thereof in a modular fashion (Figure 1). Whether or not such a modular approach is feasible is of great interest to the author.

The initial implementation of this modular approach [2] has since been applied to correct small-angle scattering data from both laboratory instruments [3], as well as synchrotron set-ups (the latter done in an automated fashion during the experiment). Thus far, the approach appears to perform well (though not particularly fast like PyFAI [4]). It is flexible enough to support at least several instruments and offers good maintainability through its modular set-up.

The method will be presented alongside practical assessments of the severity of several of the corrections. It is hoped that this presentation will encourage discussion on the potential drawbacks or pitfalls of this approach, and perchance encourage collaboration on its extension, improvement, or implementation on other instruments.

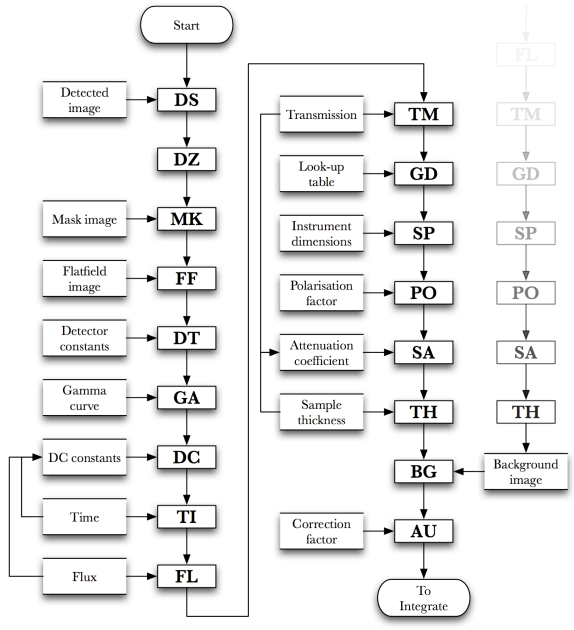

Figure 1: The modular approach for a basic set of data corrections. Reproduced from [1].

[1] B. R. Pauw, J.Phys: Condens. Matter 25, 383201 (2013).
[2] https://bitbucket.org/toqduj/imp2/
[3] J. M. Rosalie and B. R. Pauw, Acta Mat. 66, 150 (2014)
[4] G. Ashiotis et al., J. Appl. Cryst. 48, 510 (2015)