

Joint ICTP-IAEA Advanced Workshop on High Sensitivity 2D & 3D Characterisation and Imaging with Ion Beams | (smr 2856)

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Pitfalls in IBA data analysis (I)

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Content

Ion beam analysis is a quantitative analytical group of techniques, and the purpose of this lecture is to show how to avoid many pitfalls that often prevent IBA techniques from determining elemental depth profiles accurately. In fact, IBA is fraught with pitfalls. There are very many things that can be done wrong or simply go wrong unless great care is taken. We will first address pitfalls coming from experimental issues, namely: lost beam and events, calibration of fixed parameters, unwanted target-beam interactions, and other effects. These are not only relevant, but in fact essential to data analysis, because problematic data that are not what the analyst thinks it is, will lead to wrong conclusions, and it is often possible to identify issues in the data during data analysis. Then we will address pitfalls related to data analysis itself. With codes such as NDF (DataFurnace), that include a great deal of advanced physics and effects, and allow the user to fit parameters such as beam energy, angles of scattering and of incidence, or even the stopping powers and cross sections, the scope for error increased enormously. At the same time, many new IBA users no longer have a heavy background in nuclear or ion beam physics, and reliance on computer programs is a given. We will use real life examples to illustrate some of the most common pitfalls in IBA data analysis, along with steps that can be taken to prevent or remedy such problems.

Summary

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