“Reading” representations – what does this have to do with teaching and learning physics?

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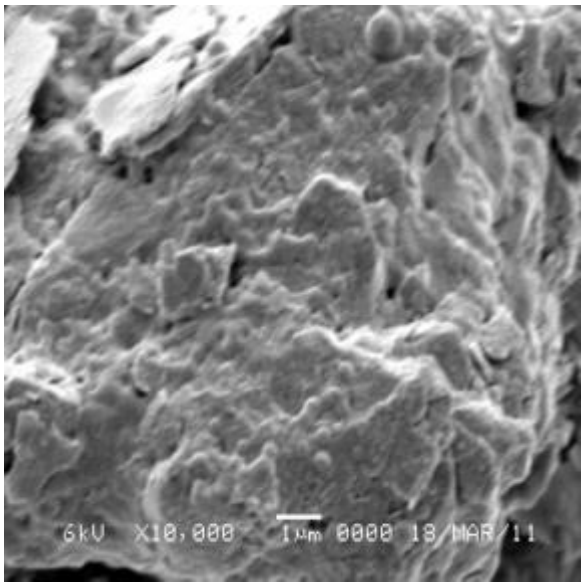

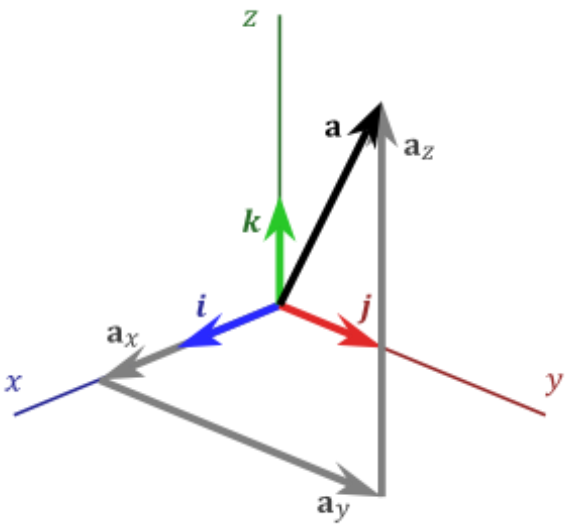

Learning physics can be compared to learning a new language in several respects. This includes learning to “read and write” the *representations* that carry the meaning of the language. In the case of physics these representations include text, gestures, mathematics, graphs, images, simulations and animations. For those who are fluent in the language, these representations are full of meaning but for the novice learning to discern the relevant disciplinary aspects of these representations (disciplinary discernment) can be a struggle. Research has shown that often teachers assume that students “see” the same things in a representation that they do. However, this is usually not true. Learning to discern disciplinary aspects of representations is something that students need help with (scaffolding). One important aspect of learning representational fluency in physics is that of *spatial thinking*, in particular learning to extrapolate three-dimensionality from one- and two-dimensional representations.

In this talk I will present a theoretical framework describing the process of teaching and learning representational disciplinary fluency. I will also provide some examples to illustrate the framework, from the perspectives of the instructor and the student.