数学与系统科学研究院

计算数学所学术报告

报告题目：**Data-constrained modelling of material microstructures with multi-spectrum X-ray CT**

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时间：**2010** 年 **7** 月 **14** 日（周三）上午 **10:00-11:00**

地点：科技综合楼 **311** 报告厅

内容摘要：

While the value of knowing the distribution of materials composition within a sample is self-evident, the experimental techniques available for obtaining such structural information are generally costly and sample destructive. X-ray computed tomography (CT) has been used as a non-destructive method to probe the internal structures of materials. However, X-ray CT only gives a microscopic map of the linear attenuation coefficient and is usually insufficient to determine compositional distributions within heterogeneous materials by the usual image rendering process. The data-constrained modelling (DCM) approach has extended the reach of X-ray CT techniques to more directly determine material composition of a sample. By combining a generic model with sample-specific CT data taken under multiple X-ray beam conditions, DCM can provide microscopic details of compositional distributions in a wide range of samples. The microscopic characterization of materials would enable increased accuracy in the modelling of the properties of bulk materials. It would have impact in a wide range from applications including exploration geosciences, corrosion, and materials science. For X-ray CT, the data-volume grows according to an inverse cubic law and the X-ray exposure grows as an inverse quadruple law with pixel size. Hence, the DCM capability to predict materials distributions below X-ray CT resolution would have an impact in situations where data-volume and X-ray exposure need to be minimized, such as with bio-medical screening applications.

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