3D TOMOGRAPHY WITH SYNCHROTRON DATA

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Resumo/Abstract:
In this talk I will describe new challenges currently faced by the image beam line at the Brazilian synchrotron source. From typical micro-tomography to phase-contrast tomography and x-rays fluorescence tomography, the 3D inverse problem has to be solved as fast as possible, and with high accuracy. For a huge volume data, typically $3020 \times 2048 \times 2048$ voxels, the first approach for computing a 3D reconstruction is the stacking process of 2D slice images. It can be shown that the tensorial product of each slice with an appropriate kernel gives a reconstruction of each voxel. Hence, the main problem remains on the 2D slice reconstruction. From the classical filtered backprojection algorithm to non-uniform Fourier transforms and iterative techniques, there is still room for major mathematical contributions on the field.