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Can one hear the heat of a body? PDEs and novel techniques of medical imaging

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Imaging sciences have always provided rich opportunities for exciting and complex mathematics applications. Medical imaging (with its CT scanners, MRI imaging, ultrasound), in particular, is famous for this.

In the talk I will provide an overview of the emerging new type of medical imaging, so called hybrid techniques, which, besides being crucial for medical diagnostics, provide a wonderful playground for a mathematician. The areas of mathematics involved range from the easily guessed PDEs and numerical analysis all the way to several complex variables, algebraic geometry, and what not.

No prior knowledge of the topic will be assumed, just familiarity with basics of PDEs.

Surveys of the mathematics of hybrid imaging and relevant further references can be found, for instance, in [1, 2].

- [1] Peter Kuchment, *The Radon Transform and Medical Imaging*, SIAM, Philadelphia, 2014.
- [2] Peter Kuchment, Mathematics of Hybrid Imaging. A Brief Review, in *The Mathematical Legacy of Leon Ehrenpreis*, Springer Verlag, Berlin 2012, pp. 183–208.