

GSI - FAIR Colloquium

Main Lecture Hall (SB1 1.120), 64291 Darmstadt, Planckstraße 1

*Tuesday, February 2, 2016,
16:15 Uhr (Tee ab 15:45)*

Pre-colloquium for students at 15:30

Walter Assmann - LMU Munich

The sound of protons - Ionoacoustic range monitoring for proton therapy

For external beam radiotherapy, ions offer a more advantageous dose distribution than photons, due to their inverse dose deposition and, in particular, a characteristic dose maximum at their end of range (Bragg peak). Therefore, a more conformal therapeutic dose can be applied to the tumor while sparing the surrounding healthy tissue, even if organs at risk are in striking distance. This makes, however, a precise positioning of the Bragg peak inside the tumor volume a challenging demand. To date, range verification in ion beam therapy relies on nuclear imaging techniques that require complex and costly detector systems, and none has yet reached clinical maturity. In this project, we make use of the pressure pulse and related acoustic wave produced when the ions stop in tissue ("ionoacoustics"). Measuring the ion range with ultrasound methods offers a simple and more direct possibility to correlate, in-vivo and in real-time, the conventional ultrasound echo of the tumor region with the position signal of the ion Bragg peak. Despite several attempts in the past, the accuracy needed in radiation therapy could never be reached. However, today's more advanced irradiation schemes with active beam scanning and dose delivery with higher pulse intensities are in favor of a more accurate ionoacoustic approach. This presentation will address our experimental and simulation work investigating the potential of the ionoacoustic method to enable sub-mm imaging of the Bragg peak.

Einladende: Christina Trautmann

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