Joint DESY and University of Hamburg Accelerator Physics Seminar

Friday, 28.01.2011

(13:00 in Room 459/30b)

Development of a Detector Setup to Determine the 2s–Hyperfine Transition of $^{209}_{83}\mathbf{Bi}^{80+}$ at the Experimental Storage Ring at GSI

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Abstract

Knowing the hyperfine transition of **H**- and **Li**–like heavy ions of the same isotope allows to test QED in extremely strong electromagnetic fields. While the transition energy of $^{209}_{83}\mathbf{Bi}^{82+}$ has been determined in previous laser spectroscopy experiments at the Experimental Storage Ring (ESR), the transition in $^{209}_{83}\mathbf{Bi}^{80+}$ is challenging and still under investigation, because of the long transition wavelength (1555 nm) and a very low signal rate due to the long lifetime of the HFS state of 82 ms. At the ESR the wavelength can be Doppler–shifted to 640 nm in forward direction. To collect these forward emitted photons a detector setup has been developed. It consists of a movable parabolic off–axis mirror, which will be positioned around the ion beam, and a very sensitive low noise PMT for detection of single photons. This talk will present the development and optimization of the setup. With the optimized system a signal rate of 50 Hz compared to 350 Hz background rate is expected.

NOTE THE UNUSUAL DATE AND TIME

J.Roßbach (Univ. HH) and M.Vogt (MFL).