

**SONDERSEMINAR/SPECIAL SEMINAR**  
**LMU/MPQ**

**am:** Thursday, June 28, 2012

**Uhrzeit:** 9:30 a.m. s.t.

**spriicht:** Professor Victor V. Flambaum  
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**Thema:** Astrophysical Evidences for the Variation of Fundamental Constants and Proposals of Laboratory Tests

**Ort:** Max Planck Institute for Quantum Optics, Garching  
H.-W.-Hörsaal

**gez. Prof. T.W. Hänsch**

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**Abstract**

There are new results for the variation of the fine structure constant  $\alpha$ , based on the quasar absorption spectra data. These results indicate the variation of  $\alpha$  in space. The spatial variation can explain fine tuning of the fundamental constants which allows humans (and any life) to appear. We appeared in the area of the Universe where the values of the fundamental constants are consistent with our existence. There is an agreement between the results obtained using different telescopes and different redshifts. Also, now there are no contradictions between the results obtained by different groups.

These astrophysical results may be used to predict the variation effects for atomic clocks which are very small and require improvement of the sensitivity by 1-2 orders of magnitude. This improvement may be achieved using  $^{229}\text{Th}$  nuclear clocks where the effect of the variation is hugely enhanced. There are also enhanced effects in multiply charged ions, and certain atomic and molecular transitions.