Contribution ID: **242** Type: **Poster**

The new PVLAS apparatus for detection of vacuum magnetic birefringence

Friday, 25 May 2012 13:31 (0 minutes)

The PVLAS experiment aims at the observation and measurement of the effect of magnetic birefringence of vacuum (MBV). This effect (predicted since long, but so far never observed directly) is the consequence of non linear terms present in the QED lagrangian. These terms result from vacuum fluctuations due to creation and annihilation of pairs of virtual charged particles and antiparticles. Because of MBV an initially linearly polarized laser light beam acquires an ellipticity when it traverses a region with a magnetic field oriented perpendicularly to its direction of propagation. The MBV effect is extremely small and a first generation version of the PVLAS experiment has been able to establish only an upper limit. We describe here the new PVLAS apparatus, whose design features far better nominal performances for sensitivity, duty-cycle, noise suppression, signal validation and calibration. The apparatus is in construction at INFN-Ferrara, it uses a 4.8 m long granite optical bench, two rotating permanent dipole magnets (each with length L=94 cm, bore diameter φ=2 cm and B2L=11tesla2meter), an ellipsometer under UHV with a high finesse Fabry-Perot cavity (for expansion of the optical path), heterodyne technique for signal over background enhancement, Cotton-Mouton effect for amplitude calibration and dephasing of the two magnets by 90 degrees for direct zero measurement.

Primary authors: ZAVATTINI, Guido (Ferrara); GASTALDI, Ugo (LNL)

Co-authors: MILOTTI, Edoardo (Trieste); DELLA VALLE, Federico (Trieste); DI DOMENICO, Giovanni (Ferrara); MESSINEO, Giuseppe (Ferrara); RUOSO, Giuseppe (LNL); PIEMONTESE, Livio (Ferrara); PENGO, Ruggero (LNL)

Presenter: GASTALDI, Ugo (LNL)

Session Classification: Experimental Systems without Accelerators - Poster Session

Track Classification: P7 - Experimental Systems without Accelerators