Contribution ID: **3** Type: **poster**

High-Quality Multi-GeV Electron Beams from Auto-Resonance Laser-Acceleration

Monday, 3 June 2013 19:30 (30 minutes)

Results from many-particle simulations will be presented that demonstrate feasibility of generating an electron bunch of over 10-GeV energy and ultra-high quality (relative energy spread of order 10−4) by cyclotron auto-resonance. The scheme employs a static magnetic field oriented along the direction of propagation of a laser beam. Tremendous energy gain by the electron from the laser field occurs if the electron injection conditions (initial position and velocity) and the laser and magnetic field parameters conspire to achieve auto-resonance: when the cyclotron frequency of the electron around the lines of the magnetic field match the Doppler-shifted frequency of the laser as seen by the electron. Accelerated electron bunches of the above-mentioned characteristics are suitable for fundamental high-energy particle physics research. In our calculations, the laser peak intensities and axial magnetic field strengths required are up to about 1018 W/cm2 and 60 T, respectively. Gains exceeding 100 GeV are shown to be possible when weakly focused pulses from a 200-PW future laser facility are used.

Primary author: Prof. SALAMIN, Yousef (American University of Sharjah)

Co-authors: Dr GALOW, Benjamin (Max Planck Institute for Nuclear Physics in Heidelberg); Prof. KEITEL, Christoph (Max Planck Institute for Nuclear Physics in Heidelberg); Dr LI, Jian-Xing (Max Planck Institute for Nuclear Physics in Heidelberg); Dr HARMAN, Zoltan (Max Planck Institute for Nuclear Physics in Heidelberg)

Presenter: Prof. SALAMIN, Yousef (American University of Sharjah)

Session Classification: Wine and Poster Session

Track Classification: Wine and Poster Session