

Operation of the Super-Aco Free Electron Laser with a Feedback Damping Quadrupolar Coherent Synchrotron Oscillation, M. BILLARDON, ESPCI; R. BAKKER, BESSYII; M.E. COUPRIE, D. GARZELLA, D. NUTARELLI, R. ROUX, SPAM/LURE; G. FLYNN, LURE - So far, on the Super-ACO storage ring, the Free Electron Laser (FEL) operation at high current (50 mA per bunch, in the two bunches mode) can provide higher average laser power and longer FEL lifetime. Though, when the current is increasing, bunch instabilities occur following distinct regimes: incoherent bunch lengthening (microwave instability) and coherent bunch movement called coherent synchrotron oscillations. The consequences are quite dramatic for the FEL because it implies a reduction of the laser gain and can prevent the start-up of the laser. Now, a new feedback system is installed damping the quadrupolar coherent synchrotron oscillation. So, all beam characteristics, relevant from the FEL point of view have been measured versus the current in presence of the feedback. Measurements of coherent synchrotron oscillations were also performed with a spectrum analyser, a dissector and a double sweep streak camera. The FEL performances, average laser power, stability and lifetime are improved.