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Multi-GeV Electron Spectrometer

R.Faccini, F.Anelli, A. Bacci, D. Batani, M. Bellaveglia, R. Benocci, C.Benedetti, L. Cacciotti, C.A.Cecchetti, A.Clozza, L. Cultrera, G.Di~Pirro, N.Drenska, F.Anelli, M. Ferrario, D. Filippetto, S.Fioravanti, A. Gallo, A.Gamucci, G. Gatti, A. Ghigo, A.Giulietti, D.Giulietti, L.A.Gizzi, P. Koester, L.Labate, T.Levato, V.Lollo, P. Londrillo, S. Martellotti, E.Pace, N.Patack, A. Rossi, F. Tani, L. Serafini, G.Turchetti, C.Vaccarezza, P.Valente

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The advance in laser plasma acceleration techniques pushes the regime of the resulting accelerated particles to higher energies and intensities. In particular the upcoming experiments with the FLAME laser at LNF will enter the GeV regime with almost 1pC of electrons. From the current status of understanding of the acceleration mechanism, relatively large angular and energy spreads are expected. There is therefore the need to develop a device capable to measure the energy of electrons over three orders of magnitude (few MeV to few GeV) under still unknown angular divergences. Within the PlasmonX experiment at LNF a spectrometer is being constructed to perform these measurements. It is made of an electro-magnet and a screen made of scintillating fibers for the measurement of the trajectories of the particles. The large range of operation, the huge number of particles and the need to focus the divergence present unprecedented challenges in the design and construction of such a device. We will present the design considerations for this spectrometer and the first results from a prototype.

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