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LASER-DRIVEN POSITRON AND MESON GENERATION

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New high-energy / high intensity laser facilities for ICF research allow to address a broad array of basic / applied physics problems **[1] [2]** For the solving of many of them, the availability of intense tertiary particle beams, including positrons, neutrons, mesons, would[be essential . This contribution attempts to analyse the chances / limitations of some contemporary / planned laser systems for such a task. Discussion of potential sources of positrons **[3]** will be dominating,

Two potential approaches will be discussed and problems with their simulation / design will be outlined : (1) Extranuclear sources. (2) Nuclear sources. In the first case, the generation of particles is based on electromagnetic processes **[4]** : triplet mechanism, Bethe-Heitler and plasma-vacuum processes. Two technical solutions are available: (11) Secondary target systems. (12) Compact target systems. In the second approach, laser-driven nuclear mechanisms are involved: excitation, transmutations and fission. Again, minimum two solutions are possible: (21) Photon-driven systems. (22) Particle-driven systems.

According to parameters of available / constructed or planned laser facilities (PETAL, NIF-ARC , ELI, etc.), first results of the analysis of possibilities of positron generation using these systems will be presented. Some results for two concrete versions of the sources will be given: (1) High-Z target irradiated by a fast laser-acelerated electron beam. (2) Low-Z target based on fast internal pair conversion process. In conclusion, prospects for potential muon / pion generation **[5]** will be shortly discussed.

References

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