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Laser plasma wakefield based axion generation and detection

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Axion and axion-like particle are the candidates of dark matter. In the current theoretical frame, they can couple with the electromagetic fields and convert to photons and vice versa. We proprosed a scheme to generate axions in a plasma bubble structure driven by two intense laser pulses. One pulse drives a nonlinear bubble wake in a plasma and the other propagates inside the bubble. The axions are generated through during the interaction between the trailor pulse and the wakefields. The axions can also generate perturbative electromagenetic fields at the same time. By analyzing the output EM fields, we give an evaluation of the axion-photon coupling strength. We use an axion inculded particle-in-cell code to study the process. The code will be introduced in another talk during this conference.

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