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## تفاعل حزمة إلكترونية مع بلازما غير متجانسة

### Interaction Between Electron Beam and Inhomogeneous Plasma

دراسة أعدت لنيل درجة الماجستير في فيزياء المادة الكثيفة

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# **Interaction between Electron Beam and Inhomogeneous Plasma**

**Thesis Submitted for Master Degree in “Physic of Dense Matter”  
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## Abstract

In this work, we studied the interaction between an electron beam and a dense matter (dense plasma). We studied the influence of the variable plasma density on the spatial growth of the beam-plasma instability, considering the model of homogeneous cold beam-inhomogeneous warm plasma system under the condition of the smallness of phase velocity of waves compared to the beam velocity. We determine a direction of the beam with unmagnetized plasma. Considering a one – dimensional electrostatic oscillation when the directions of beam propagation, plasma density gradient and wave electric field coincide with X-axis. To formulate mathematical equation of beam and plasma then we make studying equation linearized, and then study the continuity equation and boundary conditions. Formulating electric field density then study a case in which a plasma is collisional because of its high density and the temperature .Finally we drive absorbent energy and find solutions of these equations then draw it by Mathcad program. We drew the energy relationship with stable electron beam parameters and variant plasma parameters, and then we drew the energy relationship with stable plasma parameters and variant electron beam parameters. We result a raise curve. We discussed these results.