THURSDAY COLLOQUIUM

Department of Physics, Tsinghua University

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Title The generation of extremely high energy Gamma-rays through inverse Compton scattering in a thermal hohlraum

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Venue **ZhengYu-Tong Lecture Hall**

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Abstract: We proposed an idea that a γ-ray beam with extremely high energy may be generated through inverse Compton scattering when electron beams with energy of over GeV pass a thermal hohlraum filled Planck x-rays that are produced by laser beams incident on the inner wall of hohlraum like in the scheme of the inertial confinement fusion. An equation for interaction of electrons with x-rays is derived under relativistic transform, and numerical results show that such γ-ray beam is of the good directionality and quasi-monochromaticity. It may be beneficial for studies of γ-ray burst, electron-positron pair, image, etc., and may be performed experimentally in laboratories by the existing laser facilities with energy output of a few hundred kilojoules.

Introduction to the Speaker

贺贤土，理论物理学家，中科院院士。1962年毕业于浙江大学物理系。在中国核武器研究中作出了突出成绩。作为首席科学家，领导国家“863计划”惯性约束聚变主题专家组工作，为中国形成一个独立自主的惯性约束聚变研究体系作出了重要贡献。提出了较低温度下局部热动平衡点火发展到非局部热动平衡燃烧的模型。与研究群体一起获得中国首次间接驱动出热核中子的重要进展。在等离子体物理研究中，在国际上首次获得电磁波产生自生磁场的正确表达式及首次Vlasov—Maxwell方程组导得立方—五次方非线性薛定谔方程和它的孤立波解，并获得了粒子在孤立波中加速机制、等离子体相干结构小尺度湍流等多项创造性成果。在非线性科学研究中，在国内率先进行了近可积哈密顿系统Pattern动力学和时空混沌研究，国外文献评论为发现了上述系统的时空混沌和一种新的途径。贺贤土院士发表论文160多篇，多次在国际上作大会邀请报告，并多次担任有关国际会议的主席、合作主席和科学顾问委员会成员。获国家自然科学奖等多项奖。