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固体气泡损伤探测器记录高能重离子的特性

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收稿日期 2000-1-10 修回日期 网络版发布日期:

摘要 利用自行研制的大型固体气泡损伤探测器和日本国立辐射科学研究所医用重离子加速器(HIMAC)提供的高能重离子束对固体气泡损伤探测器探测高能重离子的特性进行了研究。研究说明:(1)固体气泡损伤探测器是一种新型重离子阈探测器,阈值可用临界能量损失率表征;(2)最大径迹长度与重离子的原子序数有关,利用这种关系可鉴别重离子的原子序数;(3)在重离子径迹的一定范围内,气泡线密度与重离子的能量损失率 dE/dX 有关,测定该范围内两点的气泡线密度和其间的射程可求得重离子的原子序数和能量。

关键词 [固体气泡损伤探测器](#) [高能重离子鉴别](#) [径迹探测器](#)

分类号 [TL815](#)

Characteristics of Bubble Detectors for Registration of High Energy Heavy Ions

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Abstract Studies have been carried out on the characteristics of bubble detectors for registration of high energy heavy ions using large sizes of bubble detectors made in China Institute of Atomic Energy. The studies show that:(1) Bubble detector is a new type of threshold detectors for heavy ion registration. The essence of the threshold can be expressed by critical energy loss rate. (2) The maximum track lengths of the heavy ions are corresponding to their atomic numbers one by one, by which the atomic numbers of the heavy ions can be identified. (3) A relationship between linear bubble density and energy loss rate dE/dX can be recognized in a certain interval of the track. The atomic number and energy of the heavy ion can be deduced from the distance between two points in the interval and linear bubble densities at the two points of the track. Bubble detector has the capability to identify heavy ions and is immediate, realtime and visible detector without requirement of additional instruments.

Key words [bubble detector](#) [identification of high energy heavy ions](#) [track detector](#)

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