様式２

Kathrin Wimmer 博士の研究業績概要

Kathrin Wimmer 博士は、原子核物理学分野の実験的研究において、顕著な業績をあげてきた。特に、低エネルギー、中高エネルギー不安定核（RI）ビームを活用した核構造および核反応に関する研究を推進しており、多くの先進的な成果をあげている。
以下に主要な研究業績についてその概要を述べる。

１．２核子移行反応を利用した形状共存現象の研究［1,6,23,46］
中性子過剰核では、中性子過剰度とともに核力のアイソスピン依存性と弱束縛性によって殻構造が大きく進化する現象が注目されており、魔法数の喪失や新魔法数の出現、単粒子軌道準位の逆転、異常変形の発生などが予想されている。Wimmer博士はN=20の魔法数喪失領域で予想されていた形状共存に着目し、Mg-32の変形した基底状態の近傍で球形の励起準位の探索を行った。CERN研究所・ISOLDE不安定核施設で得られる低エネルギーMg-30ビームをトリチウム標的に照射し、2中性子を移行させてMg-32の励起準位を生成した。Wimmer氏は、質量欠損法とガンマ線分光法とを組み合わせ、それぞれの特徴を活かした新しい分光法を開発し、またトリチウム標的の開発も行うなど、世界で初めて逆運動学を利用した不安定核の２中性子移行反応を成功させた。散乱角度分布の情報から球形励起状態を見いだし、そのエネルギーから、Mg-32の変形度が十分に発達していないため変形と球形状態とが共存していることを実験的に明らかとした［6］。この成果はPhysics Viewpointに取り上げられている。

２．高エネルギーRIビームを利用した2核子ノックアウト反応の研究［14,18］
核構造の実験情報を得るため、様々な反応が開発されてきたが、とりわけ2核子移行反応などの直接反応は核構造情報をえるための基礎的な反応として多用されている。しかし、直接反応では低エネルギービームを利用する必要があり、標的厚に制限が生じる。RIビームを利用した場合、その強度が微弱なため厚い標的を利用できる高エネルギービームが有効であるが、核構造研究にあった反応は限られていた。この観点で、Wimmer氏は、ミシガン州立大学・超伝導サイクロトロン研究所で得られる高エネルギーRIビームを利用して、2核子ノックアウト反応の有用性を調べる研究を行った。2核子が同時に原子核から放出される事象を選択する手法、放出された2核子の相関からスピン構造情報を取得する方法を開発し、２核子ノックアウト反応の実験学的分光学的基礎を確立した。

以上の研究業績は世界的に広く注目されており,先進的かつ開拓的なものとして高く評価されている。また、Wimmer 博士は現在 Central Michigan University で Assistant Professor として学部学生教育を行っており、また修士学生の教育活動にも熱心に取り組んでいる。

様式３

研　究　業　績　リ　ス　ト

氏　　名　　Wimmer, Kathrin

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