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Quantum anomalous Hall effect in an intrinsic magnetic topological insulator

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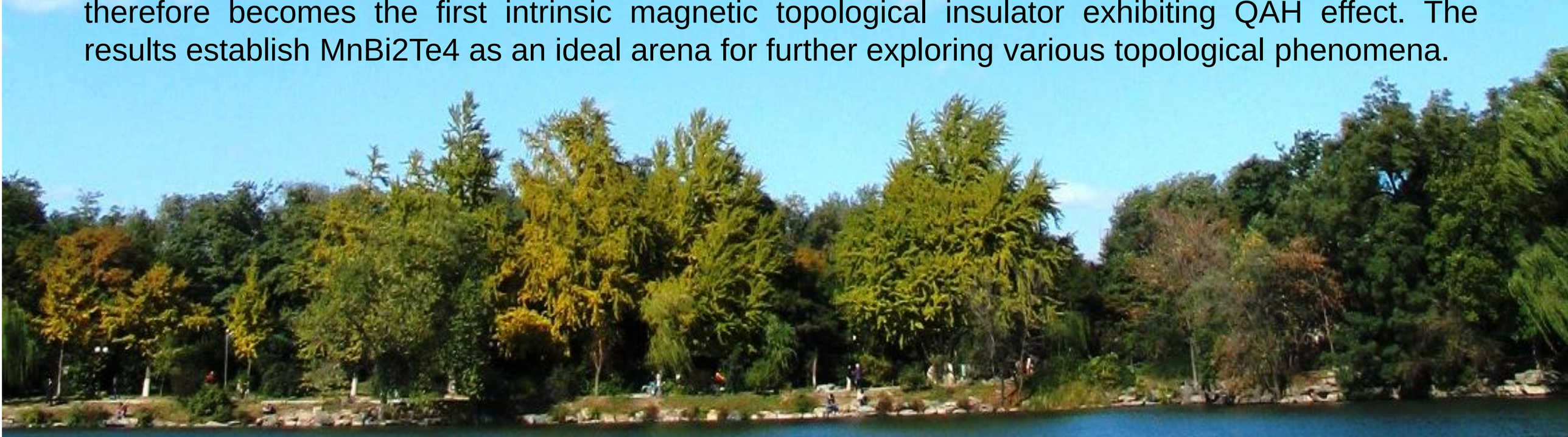
时间：11月11日（星期四）15:00—16:30
地点：北京大学物理大楼中212大教室

报告人简介（Aboutspeaker）：张远波， 2000年获北京大学学士学位。2006年获美国哥伦比亚大学物理系博士学位。同年获美国加州大学伯克利分校为期三年的Miller Fellowship，从事博士后研究。2011年起为复旦特聘教授，博士生导师。

张远波老师的研究方向为低维材料体系的电学性质研究，在量子输运和扫描隧道显微和能谱技术方面积累了一定的研究经验。获中国物理学会“叶企孙物理奖”，腾讯“科学探索奖”，“求是”杰出青年学者奖，IUPAP Young Scientist Prize (C8) 等奖项。

摘要 (Abstract)：In a magnetic topological insulator, nontrivial band topology conspires with magnetic order to produce exotic states of matter that are best exemplified by quantum anomalous Hall (QAH) insulators and axion insulators. Up till now, such magnetic topological insulators are obtained by doping topological insulators with magnetic atoms. The random magnetic dopants, however, inevitably introduce disorders that hinder further exploration of topological quantum effects in the material. We resolve this dilemma by probing quantum transport in MnBi2Te4 thin flake—a topological insulator with intrinsic magnetic order. In this layered van der Waals crystal, the ferromagnetic layers couple anti-parallel to each other, so bulk MnBi2Te4 is an antiferromagnet. Atomically thin MnBi2Te4, however, becomes ferromagnetic when the sample has odd number of septuple layers (a septuple layer represents a single structural unit in the out-of-plane direction). We observe zero-field QAH effect in a five-septuple-layer specimen; an external magnetic field further enhance the QAH quantization by forcing all layers to align ferromagnetically. MnBi2Te4 therefore becomes the first intrinsic magnetic topological insulator exhibiting QAH effect. The results establish MnBi2Te4 as an ideal arena for further exploring various topological phenomena.



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