

2006 TAIWAN INTERNATIONAL SCIENCE FAIR

CATEGORY : Physics

**PROJECT : The Development of an Orbital Angular
Momentum Sorter for High-Speed Data
Transfer**

AWARDS : Physics Second Award

SCHOOL : Herricks High School

FINALISTS : Amol Jain

COUNTRY : United States

CATEGORY : Physics

TITLE: The Development of an Orbital Angular Momentum Sorter for
High-Speed Data Transfer

NAME : Amol Jain

COUNTRY : U.S.A

An orbital angular momentum (OAM) sorter concept was designed for high-speed data transfer. The OAM of a light beam known as an optical vortex can exist in one of an infinite number of states and may be used to carry information. The augmented alphabet of states carries the potential to increase data transfer speeds over conventional binary (0 and 1) methods. A vortex generator, or OAM encoder, was constructed from a slit cover slip functioning as an adjustable spiral phase plate, and a vortex analyzer, or OAM measurer, was created using a transparent print of a computer-generated hologram. The two components were then incorporated in an OAM sorter concept that employs a novel combinatoric method for sorting data. The vortex generator and analyzer created were inexpensive simplifications of previous devices and have the potential to increase the alphabet of transmission states several thousand times over binary methods if implemented in the OAM sorter concept.

評語

This is a very fine work. The very simple method to imprint a vortex phase onto an optical beam with any charge is the most impressive I for see the author of this project will have a bright future if he continues to work in the field of quantum optics.