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**O 2: Invited Talk John Pendry**

Time: Monday 9:30–10:15

Location: HE 101

**Invited Talk**

O 2.1 Mon 9:30 HE 101

**The Perfect Lens: Resolution Beyond the Limits of Wavelength** — •JOHN PENDRY — Imperial College London

The lens is one of the most basic tools of optics but the resolution achieved is limited, as if the wavelength of light defined the width of a pencil used to draw the images. This limit intrudes in all kinds of ways. For example it defines the storage capacity of DVDs where the laser can only \*see\* details of the order of the wavelength.

Two types of light are associated with a luminous object: the near field and the far field. True to its name the far field escapes from the object and is easily captured and manipulated by a lens, but high resolution details are hidden in the near field and remain localised near

the source and cannot be captured by a conventional lens. The near field is familiar to surface scientists in the form of surface plasmons, for example. To control the near field we have developed a new class of materials with properties not found in nature. These new materials derive their properties not from the atomic and molecular constituents of the solid, but from microstructure which can be designed to give a wide range of novel electromagnetic properties.

The lecture will describe the new materials and the principles behind them and show how they may be used to control and manipulate the near field. Finally a prescription will be given for a lens whose resolution is unlimited by wavelength provided that the ideal prescription for the constituent materials is met.