Abstract
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. 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.

Biographical Sketch
Sir John Pendry has worked at the Blackett Laboratory, Imperial College London, since 1981. He began his career in the Cavendish Laboratory, Cambridge, followed by six years at the Daresbury Laboratory where he headed the theoretical group. He has worked extensively on electronic and structural properties of surfaces developing the theory of low energy diffraction and of electronic surface states. Another interest is transport in disordered systems where he produced a complete theory of the statistics of transport in one dimensional systems. In 1992 he turned his attention to photonic materials and developed some of the first computer codes capable of handling these novel materials. This interest led to his present research, the subject of his lecture, which concerns the remarkable electromagnetic properties of materials where the normal response to electromagnetic fields is reversed leading to negative values for the refractive index.

William Gould Dow Distinguished Lectureship
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