



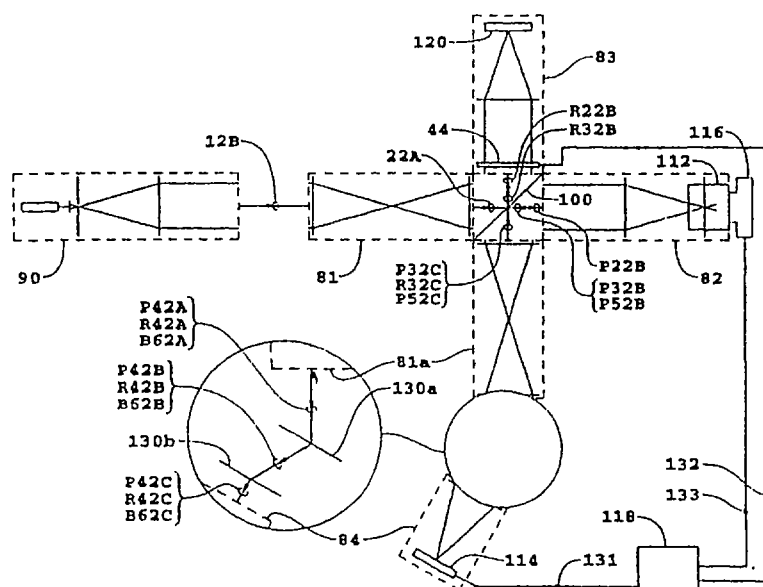
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(54) Title: METHODS AND APPARATUS FOR CONFOCAL INTERFERENCE MICROSCOPY USING WAVENUMBER DOMAIN REFLECTOMETRY AND BACKGROUND AMPLITUDE REDUCTION AND COMPENSATION

(57) Abstract

An in-focus image of a region within and/or on an object (112) is discriminated from an out-of-focus image so as to reduce errors in image information of the object by producing a probe beam (P22B) and a reference beam (R22B) from a broadband point source (90), producing antisymmetric spatial properties in the reference beam (R32B), converting the probe beam to a beam focused to a line in the region, producing an in-focus return probe beam, and producing antisymmetric spatial properties in the in-focus return probe beam (P32B). Then the in-focus return probe beam is spatially filtered (P42A) and passed through a dispersal element to focus it (P42C) to a line in a detector plane of a detector system (114). The reference beam is spatially filtered (R42A) and passed through a dispersal element to focus it (R42C) to a line in-the-detector-plane. A beam from an out-of-focus image point is spatially filtered (P62A) and passed through the dispersal element (P62C). The in-the-detector-plane spatially filtered reference beam (R42C) is interfered with the in-the-detector-plane spatially filtered beam from the out-of-focus image point (P62C) and the in-the-detector-plane spatially filtered in-focus return probe beam (P42C). An amplitude of the spatially filtered in-focus return probe beam (P42C) is detected as an interference term between the in-the-detector-plane spatially filtered reference beam, and the in-the-detector-plane spatially filtered (R42C) in-focus return probe beam (P42C) by means of the detector system (114). An amplitude of an interference term between an amplitude of the in-the-detector-plane spatially filtered out-of-focus image beam (P62C) and an amplitude of the in-the-detector-plane spatially filtered reference beam (R42C) is thereby substantially reduced, and reduces errors in data produced by the detector system (114) to represent the image information of the object.



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