EXAMINATION OF SUBJECTS USING PHOTON MIGRATION WITH HIGH DIRECTIONALITY TECHNIQUES

Abstract of the Disclosure

Methods and systems are described that examine a subject (8, 70) positioned between input and detection ports of the spectroscopic system applied to the subject. The systems shown include at least one light source (12, 14, 16, 18) radiation pattern control means (85, 120), at least one detector, processing means and evaluation means. The light source introduces at one or multiple input ports (11, 13, 15,17), electromagnetic non-ionizing radiation of a known time-varying pattern of photon density of a wavelength selected to be scattered and absorbed while migrating in the subject. The radiation pattern control means controls the time-varying relationship between the introduced patterns (i.e., relative phase, relative amplitude, relative frequency) to achieve a directional pattern of emitted resulting radiation that possesses substantial gradient of photon density. The detector detects the radiation that has migrated in the subject at one or multiple detection ports (39, 41, 43, 45). The processing means (34) process the detected radiation and create sets of data that are utilized by the evaluation means (180, 240, 276). The emitted directional radiation pattern utilizes its gradient of photon density to detect a hidden object (9) while scanning across the examined subject. The wavelength of the radiation can be selected to be sensitive to endogenous or exogenous pigments, or to cause fluorescent emission from a fluorescent constituent of interest in the subject. The operation of the systems is controlled by a computer (34).

This Sheet Has Been Replaced

