(54) Title: FREQUENCY-MODULATED CODING AND DATA RECORDING AND STORAGE USING PLASMONIC NANOSTRUCTURES

(57) Abstract: A frequency-modulated coding and data recording and storage device that uses plasmonic-dielectric nanostructures of concentric two-layer core-shell design (30) to store data includes a flat transparent substrate having a top surface (10) divided into cells with, side dimension d on the order of tens of nanometers (20) and a core-shell plasmatic-dielectric nanostructure disposed in each cell. Each plasmatic nanostructure of concentric core-shell has a predetermined ratio of radii and a predetermined aspect ratio (40 and 50) such that when an infrared or visible wavelength signal is applied to each said core-shell plasmatic-dielectric nanostructure a peak scattering amplitude of the applied signal is at different plasmatic resonance frequencies for core-shell plasmatic-dielectric nanostructures with different ratio of radii and different aspect ratios. The sampled values of a signal to be recorded are assigned to each cell and the ratio of radii and/or aspect ratios of the core-shell plasmatic-dielectric nanostructures in the assigned cells are selected to provide a corresponding plasmatic resonant frequency.
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the “Guidance Notes on Codes and Abbreviations” appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:
24 May 2007
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
 IPC: G11B 7/013; G11B 7/241

USPC: 369/101,126
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
U.S. : 369/101,126

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of data base and, where practicable, search terms used)
IEEE XPLore

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
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<tr>
<td>A</td>
<td>US 2001/0002315 A1 (SCHULTZ et al.) 31 May 2001, figs. 3, 10b and 11</td>
<td>1, 8, 12 and 16</td>
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</tbody>
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Further documents are listed in the continuation of Box C. See patent family annex.

Date of actual completion of the international search 21 February 2007 (21.02.2007)

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Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US Commissioner of Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (571) 272-3201

Authorized officer
William Korzuch

Telephone No. 571-272-7589

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