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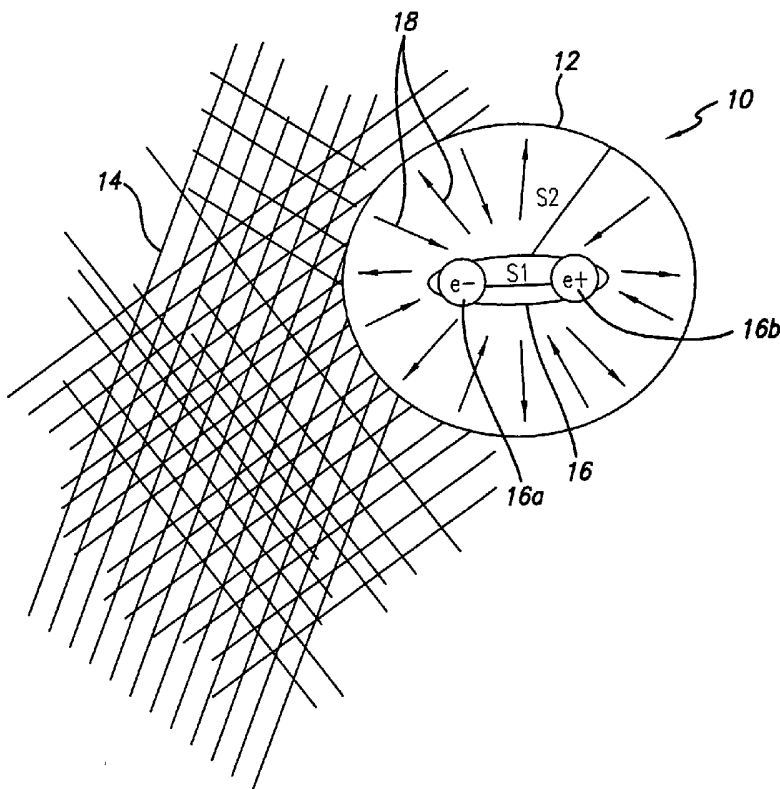
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(54) Title: HIGH DENSITY STORAGE OF EXCITED POSITRONIUM USING PHOTONIC BANDGAP TRAPS



(57) Abstract: A device is provided that can capture and store electrically neutral excited species (16) of antimatter or exotic matter (a mixture of antimatter and ordinary matter), in particular excited positronium (Ps*) (16). The antimatter trap comprises a three-dimensional or two-dimensional photonic bandgap (PBG) structure (14) containing at least one cavity (10) therein. The species (16) are stored in the cavity (10) or in an array (110) of cavities (10). The PBG structure (14) blocks premature annihilation of the excited species (16) by preventing decays to the ground state and by blocking the pickoff process. A Bose-Einstein Condensate form of Ps* (16) can be used to increase the storage density. The long lifetime and high storage density achievable in this device offer utility in several fields, including medicine, materials testing, rocket motors, high power/high energy density storage, gamma-ray lasers, and as an ignition device for initiating nuclear fusion reactions in power plant reactors or hybrid rocket propulsion systems.

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According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
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Electronic data base consulted during the International search (name of data base and, where practical, search terms used) EPO-Internal, INSPEC, WPI Data, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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<input checked="" type="checkbox"/>	Further documents are listed in the continuation of box C.	<input checked="" type="checkbox"/> Patent family members are listed in annex.
° Special categories of cited documents :		
<p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p>		<p>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>* & * document member of the same patent family</p>
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Capostagno, E

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