A NANOPLASMONIC DEVICE FOR HIGH PERFORMANCE NANOTECHNOLOGY PRODUCTS

Technology Overview

Nanoplasmonics deal with creating ultra-compact components for nanoscale photonic devices to match their electronic counterparts. Focusing on control and manipulation of plasmons at nanometer dimensions, nanoplasmonics combines the strength of electronics and photonics, and is predicted to replace existing integrated circuits and photonic devices. It is one of the fastest growing fields of science, with applications in telecommunication, consumer electronics, data storage, medical diagnostics, and energy.

In these devices localized heating is an important problem. Bulk metallic layers are generally used to remove heat, which results in spreading the heat and causing a general heating.

This technology will play a crucial role in breaking the technical limits that are encountered in various products. For example, a successful integration of this technology with hard disc drives will extend the annual increase of data storage capacity at or above 40 %, which has been slowing due to the super paramagnetic limit. A successful integration of this technology with hard disc drive heads and media will allow the hard disc drive to break the technical limits, and therefore, will allow the existence and growth of this important technology. There are even bigger markets that can utilize this technology, such as the semiconductor industry and solar cells. Since the offered technology is the first example providing localized cooling at the nanoscale, it becomes attractive for a number of emerging nanotechnology products.

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Technology Features & Specifications

This specific technology offers a novel nanoplasmonic device with nanoscale cooling affect providing satisfactory cooling in an efficient and compact manner for various products such as in hard disk drives in computing and sensor systems.

The device comprises a unique “nanoplasmonic layer” having a heating side and a cooling side and also includes a cooling structure adjacent to the cooling side of the “layer”. The localization of these cooling structures is engineered for rapid cooling and focused cooling effects-minimizing any heating related performance loss in real life applications. The overall design of this novel device enables to remove heat from the layer effectively in a compact manner. This technology will play a crucial role in breaking the technical limits that are encountered in various products. For example, a successful integration of this technology with hard disc drives will extend the annual increase of data storage capacity at or above 40%, which has been slowing due to the super paramagnetic limit.

Potential Applications

This technology may serve to semiconductor industry, software/hardware industries, energy and environment as use in near-field imaging applications, solar cells, nanolithography, optical data storage, heat assisted magnetic recording, light emitting devices, spectroscopy, medical applications, bio-chemical sensors, femtosecond pulse shaping, single molecule spectroscopy, single molecule fluorescence enhancement, and plasmonic waveguide.

Costumer Benefits

- Effective, rapid and focused cooling effect
- Minimized performance loss in real life applications
- Compact manner

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