Narrow nanometer-thin optical filters based on double Fano resonance in metallic films (Ramot)

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Realize a spatially varying, nanometer-thick optical filter, with high spectral resolution (a few nanometer) at an arbitrary spectral band.

Such filters could be integrated with light array detectors (CCD) to realize truly, high-performance, miniature spectrometers.

Scientific background of the technology

Category: Nano-photonics, meta-surfaces - sub wavelength variations of materials for desired optical response.
Main idea: generalization of the universal phenomenon of Fano resonance, leading to asymmetric spectral line shapes. Using a simple geometry to realize a double-Fano resonance having very narrow spectral line shapes.

Our filters could be integrated with array photo-detectors (CCD) to realize high-performance miniature spectrometers.

Optical Spectrometer Market is growing rapidly, the technology allows identification of materials, chemical compounds, pollution, etc.

Features of the solution

- The use of a double Fano resonance can lead to very sharp spectral transmission\reflection profile with a grating structure – leading to high resolution filters.
- Extremely thin footprint.
- Tailored spatially varying response
- Applicable to a very wide spectral range (from UV to mid IR, depending on substrate being used)
- Can easily be integrated with\fabricated on a CCD device.

The main advantages:

- No contact with the material. Reducing cost, preventing infections.
- Spectral solutions obtain instant accurate measurements.
- Saves manpower, time and money.
- Reduced size, allowing integration within a smartphone.

Applications:

- Medical: Measuring of higher variety of chemical parameters.
- Manufactures: Used to detect chemical composition of products.
- Controlled agriculture: Plant status, level, pH, water, fertilizers, chemical substances and types of spray.

IP
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