The traditional imaging methods used in clinics to detect and screen breast cancer include X-ray, mammography, ultrasound, magnetic resonance imaging (MRI) etc. Even though these methods are well developed but there are associated disadvantages as well. Inability to distinguish between malignant and benign growth, harmful accumulation of radiation, high cost, low resolution and inability to provide diagnostic information are few of the known drawbacks. Also breast imaging modalities face the challenge of inability to detect small tumors at early stages of growth, determining the location of the tumor and assessing the tumor margin.

The ultimate purpose of the invention is to provide Time Reversal Optical Tomography (TROT) for near infra-red (NIR) diffuse optical imaging of targets, resulting to non-invasively detection, locating and diagnosis of targets in highly scattering turbid medium such as tumors in human breast in early stages of growth.

- Breast Cancer Detection & Imaging
- Locating and diagnosing other cancers such as tumors in ovary and prostate.
- Potential application in atmospheric remote sensing, underwater imaging, and non-destructive process monitoring.

- No tissue removal required
- Multiple wavelengths can be used to retrieve spectral information of the target.
- Small targets can be detected by TROT, important for early stage detection.
- Much cheaper in comparison to traditional methods and also can be made portable.
- Light beam used is in safe range and does not led to accumulation of harmful radiations in body.
- TROT is non-iterative, and faster than other iterative DOT approaches

Medical imaging market, which represents the largest segment within the global medical devices market, has witnessed significant growth in the last decade and the trend is set to persist in the foreseeable future. The global market for Medical Imaging is forecast to reach US $5.9 billion by the year 2017, primarily driven by the technological advancements, resulting in improved imaging equipment.

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