

## METHOD AND SYSTEM FOR ULTRASONIC REGULARIZED NAKAGAMI PARAMETER IMAGING FOR MICROWAVE HYPERTHERMIA MONITORING

### IITM Technology Available for Licensing

#### Problem Statement

- **Lack of Real-Time Temperature Monitoring:** Existing cancer hyperthermia treatments lack reliable real-time temperature monitoring, hindering their effectiveness.
- **Costly Imaging Methods:** Current imaging methods like CT and MRI for treatment monitoring are expensive, limiting their accessibility.
- **Ultrasound Temperature Limitations:** Ultrasound-based temperature monitoring has accuracy issues, especially at higher temperatures.
- **Nakagami Imaging Challenges:** Current Nakagami imaging lacks resolution and contrast, making interpretation difficult.
- The immediate patent disclosed here aims to solve these issues with an **innovative, cost-effective, and accurate ultrasound-based temperature monitoring system.**

#### Technology Category/ Market

**Categories:** Applied Mechanics & Mechanical Engineering, Assistive, Test Equipment & Design

**Industry:** Medical and Healthcare, Medical Device Manufacturing, Biotechnology, Oncology, Clinical Research, Healthcare Cost Reduction

**Applications:** Cancer Hyperthermia Treatment, Thermal Ablation Procedures, Non-Invasive Temperature Assessment, Image-Guided Microwave Hyperthermia, Clinical Oncology, Ultrasound System Integration, Medical Research, Healthcare Cost Reduction

**Market:** The global hyperthermia treatment for cancer market is estimated to be valued at **US\$ 99 M in 2017** and is slated to reach a market value close to **US\$ 160 M in 2025**, growing at a **CAGR of 6.1%** during the forecast period (2017–2025).

#### TRL (Technology Readiness Level)

TRL - 4, Experimentally validated in lab.

#### Intellectual Property

IITM IDF No: 1868;  
Application No: 201941020557

#### Research Lab

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#### Technology

A system for real-time ultrasound-based temperature monitoring during microwave hyperthermia treatment is disclosed here in this present patent.

It includes an ultrasound module for precise temperature estimation and a regularized imaging module that reduces variability in temperature measurements. FIG. 1 illustrates a block diagram of a system for ultrasonic regularized Nakagami parameter imaging for microwave hyperthermia monitoring applications, in accordance with the disclosed embodiments.

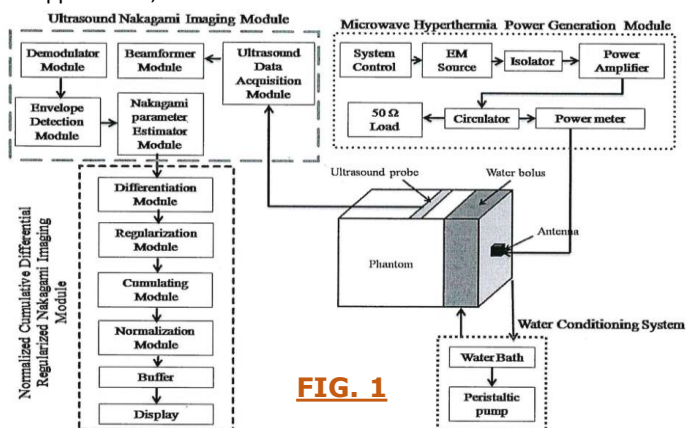


FIG. 1

#### Key Features / Value Proposition

##### ❖ User Perspective:

- **Real-time Monitoring:** Provides real-time ultrasound monitoring for effective thermal treatments.
- **Precision:** Uses Nakagami parameter imaging for accurate temperature assessment.
- **Non-invasive & Affordable:** Offers non-invasive, cost-effective solutions for patients and healthcare.

##### ❖ Technology Perspective:

- **Integration:** Seamlessly integrates with ultrasound systems.
- **Advanced Imaging:** Utilizes Nakagami parameter imaging for temperature estimation.
- **Efficiency:** Real-time capabilities with low computational complexity.

##### ❖ Industrial Perspective:

- **Market Potential:** Addresses cancer treatment needs, creating market opportunities.
- **Integration Appeal:** Attracts ultrasound system providers seeking enhanced features.
- **Cost Efficiency:** Affordable alternative to MRI and CT-based monitoring methods.

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