

# Methods for Positronium Lifetime Image Reconstruction

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## ABSTRACT

Researchers at the University of California, Davis have developed a technology involving statistically reconstructing positronium (or positron) lifetime imaging (PLI) for use with a positron emission tomography (PET) scanner, to produce images having resolutions better than can be obtained with existing time-of-flight (TOF) systems.

## FULL DESCRIPTION

The technology leverages positron emission tomography (PET) scanners to provide reconstructed positronium lifetime imaging (PLI). It improves the scanning precision, allowing for noninvasive, clear imaging of tissue and enabling better medical treatment plans.

## APPLICATIONS

- ▶ Improves resolution, providing more precise imaging than existing TOF systems
- ▶ Allows for noninvasive patient examination
- ▶ Enables accurate identification of hypoxic regions in a human body
- ▶ Compatible with existing PET scanners
- ▶ Overcomes the lack of practical methods for imaging positronium lifetimes at high spatial resolutions
- ▶ Improves upon the limitations of current PET imaging solutions that ignore the lifetime history of positrons

## FEATURES/BENEFITS

- ▶ Healthcare and medical imaging
- ▶ Cancer staging and treatment planning
- ▶ Development and enhancements of PET scanners

## PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20250370148	12/04/2025	2022-579

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## INVENTORS

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## OTHER INFORMATION

### KEYWORDS

positronium lifetime,  
 lifetime image  
 reconstruction, PET  
 scanners

### CATEGORIZED AS

- ▶ **Imaging**
  - ▶ Medical
  - ▶ Molecular
- ▶ **Medical**
  - ▶ Devices
  - ▶ Diagnostics
  - ▶ Disease: Cancer
  - ▶ Imaging
- ▶ **Sensors & Instrumentation**
  - ▶ Analytical
  - ▶ Medical

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2022-579-0

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