Startup to develop new solid-state technology at UCLA for use in medical imaging

April 2 2010

While today many medical-imaging needs are being met with traditional vacuum tube-based technology, large segments of the X-ray-imaging market are poorly served, and there is widespread demand for both performance improvements and cost reductions.

Based on groundbreaking patented technology licensed from UCLA, startup company Radius Health is developing a lightweight, flat-panel X-ray source — Microemitter Array X-rays (MAX) technology — that has the potential to address these needs by enabling new X-ray imaging applications while lowering the cost of traditional applications.

The startup has been selected to move into the UCLA on-campus incubator space at the California NanoSystems Institute to develop a lightweight X-ray emitter employing MAX technology — an X-ray source on a chip capable of delivering the same spectrum as traditional sources.

The MAX technology was developed by Gil Travish, Ph.D., a research scientist in the UCLA Department of Physics and Astronomy, and his colleagues James Rosenzweig, a UCLA professor of physics, and Rodney Yoder, an assistant professor of physics at Manhattanville College in New York.

The MAX technology works like this: Using an array of particle sources from microfabricated structures, parallel X-rays are generated uniformly across a flat panel. The MAX source, which can be produced using the

current generation of semiconductor foundry processes, generates diagnostic X-rays without the need for fragile vacuum tubes and bulky, expensive power electronics and radioactive materials.

The technology has the potential to deliver advanced — and potentially safer — imaging options than are available with current commercial X-ray systems, and to extend the 'application space' of X-ray radiology.

"Moving our development activities into CNSI is a real landmark moment for us," said Mark Evans, CEO for Radius Health. "The access to the facilities and knowledge will greatly help us accelerate our product to market and bring this key technology nearer to deployment in clinical systems."

Radius Health expects to make extensive use of the microfabrication facilities at the new Integrated Systems Nanofabrication Cleanroom at CNSI.

The use of pyroelectric emission is important, as the voltage required to generate electrons within the X-ray production process is produced within a crystal, eliminating the need for 'clean' power supplies, transformers, high-voltage electronics and the associated shielding required — and most importantly, fragile vacuum tubes.

Unlike past efforts with pyroelectric-based sources, Radius Health is able to control the emission of electrons and thus maintain a stable and controlled emission of X-rays, which allows this type of source to be applied to clinical applications.

The journey from vacuum tubes to flat panels could be as transformational in X-rays as it has been in visual displays.

"In most areas of electronic product development, such as computing,

displays and radar, solid-state technology has replaced vacuum-tube technology due to the improvements in reliability, energy consumption and portability," Travish said. "We see this story being extended to X-ray sources."

Provided by University of California - Los Angeles