

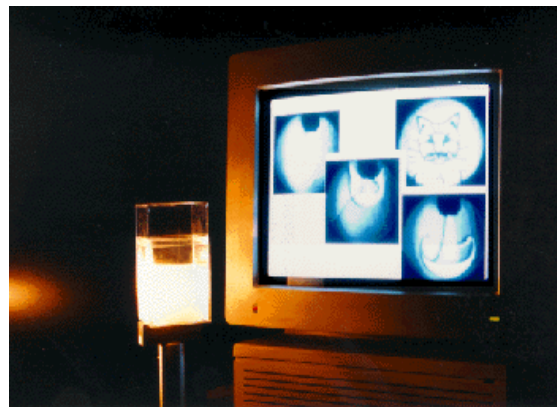
The CUNY Center for Advanced Technology In Photonics Applications (CUNY CAT)
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Optical Imaging in Fogs, Sprays and Droplets

Using commonly available lasers and optics, a new technology has been developed that enables imaging and monitoring of droplet distribution in optically dense environments. The method can also be used to detect hidden objects in an environment, and so may have applications to space, industry, biomedicine, and materials.

Potential commercial uses:

- Feedback for rocket engine injection design
- Monitoring and feedback for fuel or oxidizer spray atomization-based combustors
- Medical imaging
- Real-time imaging in turbid media without using hard radiation



The beaker contains a highly scattering medium through which the translucent droplets were imaged. The computer monitor displays several images (e.g. a cat) that were acquired using the ultrafast methods.

Benefits

- Processes can be imaged through highly scattering media
- No use of hard radiation (x-rays, γ -rays)
- Technique is nondestructive

The Technology:

Optical techniques to image objects in highly scattering, opaque media are severely limited because of beam steering and extinction. The use of penetrating radiation is limited by the absorption properties of the material being imaged, and by the health hazards posed to operators. With ultrafast lasers and optical switches, a portion of the non-diffuse light can be utilized to capture images of objects hidden in opaque media.

As an example, an initial application of this method was to image through dense sprays created by hundreds of individual injection elements in a rocket combustor. This method can generate valuable data on fuel characteristics to improve combustion efficiency. The imaging technique can be adapted to other applications.

This technology opportunity sheet describes continuing efforts in this area. Several patents may have been issued or are pending and which may be available for licensing.

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