**3-D structure of a gasoline spray by polycapillary X-ray -tomography**

S. Alfuso(1), L. Allocca(1), S. Dabagov(2)(3)(4), D. Hampai(2), A. Liedl(2)

L. Marchitto(1), C. Polese(2)

*(1) Istituto Motori – CNR, Via Marconi 8, Napoli – Italy*

*(2) Laboratori Nazionali Frascati – INFN, via Fermi, Frascati – Italy*

*(3) PN Lebedev Phys. Inst., Moscow, Russia*

*(4) NR Nuclear University MEPhI, Moscow, Russia*

Presenting author: **Luigi Allocca**, *l.allocca@im.cnr.it*

An experimental investigation of a fluid to reconstruct the internal structure was carried out by an X-ray -tomography technique using a Cu K source coupled with polycapillary optics and a CCD detector. The fluid was a transient gasoline spray generated by a multi-hole GDI injector for automotive applications at 40 MPa injection pressure and 4.0 ms duration. Measurements of mass density and droplet fragmentation in a region of few cubic millimeters downstream the injector nose are of huge importance to define the atomization process and the air/fuel mixture formation going on for the combustion.

The coupling of a conventional X-ray source with polycapillary optics increased greatly the radiation flux, shaping a low-divergent beam and overcoming the relative low absorption of the hydrocarbon chain. The experimental setup is restrained in a table-top configuration contrary to the synchrotron sources generally used for these samples. Extinction images acquired along the line-of-sight source-spray-detector permitted the reconstruction of a 3D structure of the spray and its morphology. Gaussian-type distribution of the fuel densities results for the cross sections of the jets with peaks along its axis and a decreasing behavior toward the periphery.