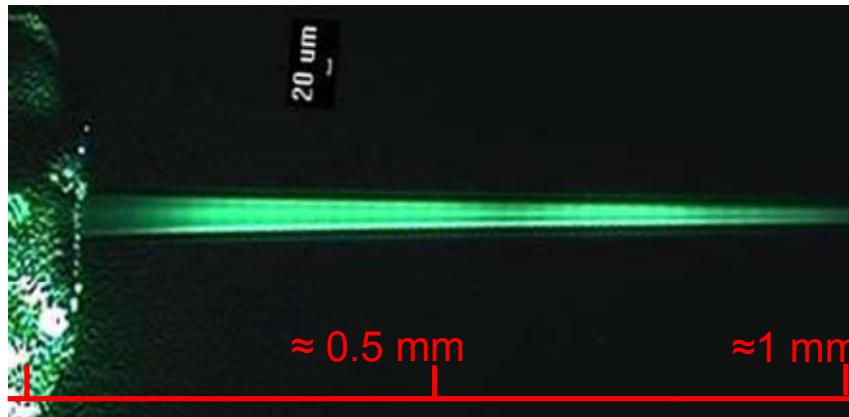


Collimated Aerosol Beam and its Application to Direct-Write Technology

(in collaboration with Profs. Orv Swenson and Doug Schulz)

The term direct-write encompasses film deposition processes whereby no additional processing steps (e.g., photolithography) are required to produce patterned functional structures of electronic materials such as metallic interconnects and semiconductor diodes and transistors. Material deposition based upon directed aerosol flow has the potential of finding application for fabrication of electronic and sensor devices.

Recently, the influence of Saffman force upon the fluid dynamics of focused aerosol flows through micro-capillaries has been established by our group through a combined theoretical/experimental approach.



Laser-illuminated aerosol beam leaving 100 μm micro-capillary

These results were used in the rational design of a micro-capillary “aerosol gun” capable of generating a focused collimated beam where aerosol particles stay very close to a capillary center line. The feasibility of CAB-DW was established theoretically and experimentally and the utility of such an aerosol gun was demonstrated by printing Ag-based and Si-based inks.

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