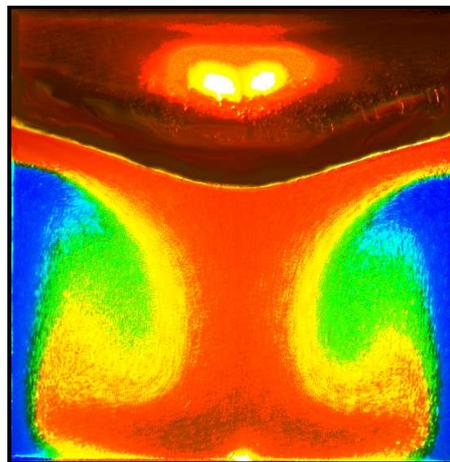


Title: Particle Image Velocimetry and Thermometry in Freezing Water

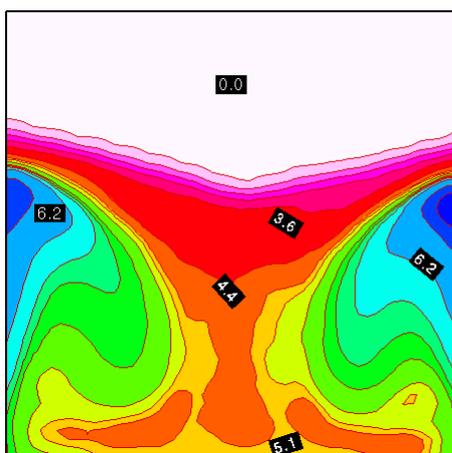
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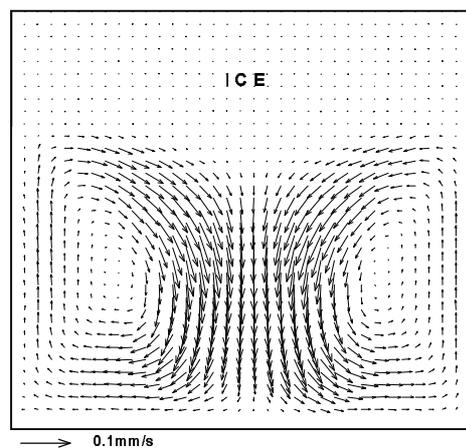
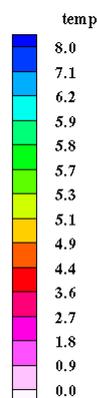
Ice crystal growing from the top in a lid cooled cavity. Thermochromic Liquid Crystals are used as tracers to evaluate both the temperature and velocity flow fields. A plexiglas cube is immersed in an external water bath of temperature $+20^{\circ}\text{C}$. The isothermal metal lid has temperature -10°C . Flow is observed at the centre vertical plane of the cavity. Figure illustrates flow circulation with a cold stream along the cavity axis (red colour response of the TLCs) and a warm reverse flow along side walls (green to blue colours of the TLCs). Analysis of the tracers colour allows to evaluate the temperature field (b). Cross-correlation performed for a sequence of 2-5 images is used to evaluate the flow velocity field (c).



(a)



(b)



(c)