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Life Marker Chip and its Detection Technologies

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The Life Marker Chip (LMC) instrument aims to detect organic molecules on Mars as part of the 2018 planned ESA/NASA rover mission. The LMC is based around use of immuno-assay technology from bio-technology where a molecular receptor binds to a target molecule. This binding is detected using fluorophores attached to the molecular receptor. High sensitivity (ppm to ppb) can in principle be achieved using immuno-assays and antibody based molecular receptors. The fluorescence excited by light from a laser is detected using a cooled position sensitive CCD detector with an image of the assay region relayed to the detector using coherent fibre optics and relay lens systems. The assay takes place on a silicon nitride waveguide which is used to direct the laser light to the assay and excite the fluorophores using evanescent excitation. The LMC consortium, science objectives, detector technologies, overall design and current status will be described.

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