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Indium bond research for crystalline cryogenic suspensions

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Pure indium bonds to itself and non-metallic substrates like fused silica with comparable ease. Its vacuum compatibility, thermal conductivity [1], malleability and low mechanical loss [2,3] and low melt point also make it a good candidate for use in cryogenic systems. Currently it is proposed for use in the sapphire KAGRA suspensions [6] as well as a possibility for the silicon interfaces of the future ET detector [5]. This poster explains two approaches to achieve strong, low noise indium bonds. One using layers of indium nanometres thick evaporated onto silicon substrates and bonded at the Institute for Gravitational Research in Glasgow. A second approach uses inductive heating of indium foil between sapphire substrates with the aim of bonding suspensions in a detector in-situ, conducted in part at the ICRR in Tokyo, Japan.

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