

Characterisation of bonded silicon components towards assemblies for 3rd generation detectors

A crucial milestone was recently completed in the IGR in the form of the first silicon suspension hanging on Hydroxide catalysis bonds and surviving cooling to cryogenics temperatures. Although the prototype allowed to validate multiple engineering concepts, it is expected that HCB won't meet the thermal noise requirements for the 3rd generation of gravitational waves detectors. For this reason, the focus is now placed on improving the bonding technique, and particularly on investigating direct bonding. A range of surface activation processes is studied with the help of a brand-new surface profiler to correlate surface property and bond quality. Bonded samples are prepared for strength and mechanical loss measurements. The testing processes have had to be re-thought to fit the new geometry used, and preliminary results on the effect of pre and post-processing are obtained.

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