Subject: VRB request to approve waiver on qualifying a high QE photodiode
From: Dennis Coyne <coyne@ligo.caltech.edu>
Date: 3/22/2016 2:57 PM
To: Jon Feicht <feicht_j@ligo.caltech.edu>, Chandra Romel <romel_c@ligo-wa.caltech.edu>, Scott McCormick <smccormick@ligo-la.caltech.edu>, Rainer Weiss <weiss@ligo.mit.edu>, John Worden <worden_j@ligo-wa.caltech.edu>, Mike Zucker <mike@ligo.mit.edu>, Fred Raab <raab_f@ligo-wa.caltech.edu>

LIGO-L1600055-v1

Dear Vacuum Review Board (VRB) members,
As a reminder, our general procedure (E1000088) for qualifying a new material or assembly/component for LIGO UHV service, is to:
1) evaluate outgassing with an RGA (per procedure E080177) after cleaning and vacuum baking a sample of the material/component, and
2) place a sample(s) of the material/component into a high irradiance optical cavity for long duration exposure testing (P990032).
While the RGA testing is relatively quick, the optical cavity exposure tests are time consuming (order of 1 month).

We have recently purchased high quantum efficiency InGaAs photodiodes to replace (upgrade) the photodiodes currently in use. These devices are windowless, with exposed bond wires. Due to concerns of (and some experience with) damaging windowless photodiodes, we wish to do very minimal cleaning. Moreover, we are concerned that (like our optics) baking in a vacuum chamber will cause a film deposition on the active surface which may degrade the efficiency of the device. Consequently we propose to not bake these devices.

We have taken two of these devices and tested the outgassing with an RGA. Please see E1600086-v1.

My questions to the VRB are as follows:
1) Do you agree that we can waive the requirement to perform the optical cavity exposure tests to qualify these photodiodes?

2) Do you agree with the proposal to minimally clean (as described in E1600086) and to not bake (air or vacuum) or obtain an RGA scan, for the reasons stated in E1600086?

best,
Dennis

P.S. for the new VRB members, Jon and Chandra:
The VRB wiki is https://awiki.ligo-wa.caltech.edu/aLIGO/System-wide_Information/VRB
The VRB charter is M1400339
Other useful links:
E1000193, LIGO UHV Qualification Test Results
E1000088, Qualifying Parts for LIGO UHV Service

--
Dennis Coyne
Chief Engineer, LIGO Laboratory
California Institute of Technology
MC 100-36, 1200 E. California Blvd.
Pasadena, CA 91125 USA
Telephone 626.395.2034
https://ligo.caltech.edu/