DRAFT

US LHC Accelerator Research Program
Task Sheet

Task Name: Luminosity Monitor **Date:** 29 June 2004

Responsible Person(s) (overall lead, lead at other labs)**:** John Byrd, LBNL

Budget (specified for each lab)**:** FY05 $395k

FY05 Milestones
1) Sep 04. 40 MHz performance demonstrated, with required accuracy & sensitivity
2) Nov 04. Technical and Cost review: go/no go decision for continued prototype construction
2005) Design & Fab of final prototype
2005) Deliver engineering design of integration into TAN; Conceptual design for IP2 & 8
2005) Evaluate options for performing a radiation hardness test
2005) Begin interface to CERN DAQ

Statement of work for FY05 (include description of year's "deliverable" and, if appropriate one or a few intermediate milestones)**:**

Following the successful beam tests of the prototype detector, we need to complete the the design and fabricate the final prototype detector, incorporating the lessons learned in the commissioning of the first prototype. We also need to finalize the integration of the detector into the TAN and design a conceptual installation for Ips 2 and 8.

We also will begin to interface the detector to the CERN 40 Mhz DAQ and use it for beam tests at ALS and possibly elsewhere if possible. We will also be making improvement to the front end electronics to improve the reliability and performance. In particular, we will evaluate several pulse shaping schemes on the bench and in beam tests at the ALS.

We will also begin planning a test to assess the radiation damage on the detector in the LHC environment. We expect this test to be particularly difficult to obtain a definitive result and will require significant planning. We have established contact with researchers at UC Berkeley who have experience in this area.

We plan to begin the year by holding a technical design review detailing the performance of the prototype and the plans for producing a final detector.

Statement of expected follow-on work in subsequent years (include "ultimate" goal and time scale for this sub-program, as well as plans for specific work and rough budget need for next 2 years)**:**

The ultimate goal is to produce a luminosity monitor ready for installation in several IPs at the LHC at initial commissioning. Following the successful qualification of the prototype detector in FY04, we will need to accomplish several tasks over the next few years. Because of the high radiation environment in the TAN, it will be interesting to test the detector in a comparable radiation environment. A meaningful test will involve a substantial amount of planning and preparation. We will also produce an engineering

design of the entire LHC installation. Additionally, we will need to incorporate the device in the planned CERN DAQ and LHC control system.

Rough budget needs are the following: $550k in FY06.