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Laboratory of High Energy Physics  
JINR

Dear Search Committee Members,

I am writing to convey my strong support of Amaresh Datta's application for a postdoctoral position with the SPD team at JINR. I know Amaresh well, having had the good fortune of being his thesis advisor at the University of Massachusetts Amherst, where he completed his Ph.D. in the experimental nuclear physics group in 2012.

Amaresh is well-established researcher, known early in his career for his work within the spin physics group of the PHENIX collaboration starting 2006 at the Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory. His thesis work focused on the analysis of collisions of longitudinally polarized protons at a center of mass energy of  $\sqrt{s} = 62.4$  GeV, to extract the double longitudinal spin asymmetry and production cross-section of non-identified charged hadrons at mid-rapidity, using the central arm detectors of PHENIX. He carried out this difficult analysis largely on his own, and was the chair of the paper writing committee, culminating in a publication: A. Adare *et al.* (PHENIX Collaboration), "Cross sections and double helicity asymmetries of mid-rapidity inclusive charged hadrons in  $p + p$  collisions at  $\sqrt{s} = 62.4$  GeV", *Phys. Rev. D* **86**, 092006 (2012). These results are an important probe of the kinematic limits of applicability of perturbative QCD, and contribute to efforts to understand the contribution of gluons to the spin of the proton, particularly at high Bjorken- $x$ .

I note that Amaresh worked efficiently on the analysis above, but its publication was delayed internally nearly a year because some of its results conflicted with a related ongoing analysis in PHENIX. This was resolved after much study when Amaresh uncovered a subtle bias in trigger selection in the other analysis - his own analysis was robust and very well done - a consistent theme in his work.

Amaresh also contributed significantly to quality assurance checks on PHENIX detector data, and played a crucial role in calibrating the luminosity monitors for PHENIX, where he was a leading expert for many years. This latter work was essential for a flagship PHENIX measurement of the parity-violating asymmetry and cross section of  $W$ -production in polarized  $\vec{p} + p$  collisions at  $\sqrt{s} = 500$  GeV: A. Adare *et al.* (PHENIX Collaboration), "Cross Section and Parity Violating Spin Asymmetries of  $W^{\pm}$  Boson Production in Polarized  $p + p$  Collisions at  $\sqrt{s} = 500$  GeV", *Phys. Rev. Lett.* **106**, 062001 (2011).

In addition to his thorough understanding of data analysis, Amaresh had significant expertise in PHENIX detector simulation software based on GEANT3. Amaresh was also selected for a major responsibility within PHENIX as the Analysis Taxi coordinator. This involved maintenance of the extensive PHENIX software repository, handling analysis job submission and processing, and

coordination with the many physics working groups. Amaresh did a great job in this demanding position, demonstrating detailed technical knowledge and excellent management skills.

As indicated above, I was very happy with Amaresh. He is smart, mature, and reliable. He works independently and communicates well both orally and in writing. He is thoughtful and his work is of high quality and demonstrates a thorough understanding of the underlying physics, and mastery of many of the subtleties in data analysis. Amaresh established himself as a very valuable, respected, seasoned member of the PHENIX collaboration, able to go from raw data to a publication.

After graduating from UMass Amherst, Amaresh worked on  $J/\Psi$  and Drell-Yan physics (2012-2015) with Doug Fields at the University of New Mexico, using an innovative approach to the same outstanding mystery of understanding the origin of proton spin in terms of its constituents. The latter has been a great puzzle in nuclear physics since the 1990s, rich in physics and full of surprises. It continues to be one of the major goals of the field, and part of nearly all new initiatives in nuclear physics, from significant detector upgrades (from PHENIX to sPHENIX), to entirely new machines, such as the proposed Electron-Ion Collider (EIC).

Since May 2015, Amaresh had been doing very well at the University of Hawaii, where he has worked on AMS-02 and NA61/SHINE, studying light nuclei formation in interactions of cosmic rays with the interstellar medium using collider data, and conducting searches for anti-nuclei in cosmic ray as signatures of dark matter annihilation.

All of his work - leading research in spin physics, extensive experience in data analysis and detector simulation are excellent preparation for your position.

In summary, Amaresh has excellent prospects for conducting new research projects with care and independence. He is collegial and conscientious. Amaresh is a superb candidate and I recommend him very highly, without reservation.

If more information would help in your decision-making, please don't hesitate to contact me.

Sincerely,



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