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Expanding the observational capabilities of the Jicamarca incoherent scatter radar

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The Jicamarca Radio Observatory is an atmospheric and geospace research facility of the Geophysical Institute of Peru (IGP) and is located near the magnetic equator in Peru. The observatory supports different types of experimental investigations related to studies including but not limited to meteor science, fundamental ionospheric science and space weather at low latitudes. Jicamarca also operates a 50 MHz incoherent scatter radar (ISR) system that is part of the ISR network in the American sector supported by the US National Science Foundation (NSF). In this talk, we will present the status of an ongoing effort supported by the NSF Major Research Instrumentation (MRI) Program that targets expanding the observational capabilities of Jicamarca. The expansion consists of building two stations capable of receiving echoes from the high power, large aperture VHF ISR system and, potentially, from other transmitting systems at Jicamarca. The receiving stations are based on the Long Wavelength Array (LWA) telescopes [1]. The first station will be deployed at the Observatory of Huancayo, which is located around 170 km east of Jicamarca, and the second station will be located on the Santa Maria campus of the Pontifical Catholic University of Peru (PUCP), located about 50 km south of Jicamarca. Each station will operate over a wide band (~3-90 MHz) and will allow for perpendicular-to-B and oblique radar observations. Additionally, the system will allow multistatic observations that will add wavenumber diversity to radar experiments and allow better measurements of vector Doppler velocities. The effort targets benefiting research areas such as mesosphere and lower thermosphere (MLT) dynamics, meteor science, ionospheric irregularities, meteor radio afterglows, and incoherent scatter radar studies of ionospheric plasma drifts. Additionally, we envision the stations to be used independently in low frequency radio astronomy investigations.

1. Taylor, G.B., Ellingson, S.W., Kassim, N.E., Craig, J., Dowell, J., Wolfe, C.N., Hartman, J. et al., First Light for the First Station of the Long Wavelength Array, Journal of Astronomical Instrumentation, Vol. 1, No. 1, 1250004, DOI: 10.1142/S2251171712500043, 2012.