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Updated orbital parameters for LMC P3 with SALT/HRS

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LMC P3 is the most recently discovered, and the most luminous, γ -ray binary. The source was discovered with Fermi-LAT γ -ray observations which showed a 10.301 ± 0.002 day period. The γ -ray emission is associated with the previously detected point-like X-ray source CXOU J053600.0-67350, within the supernova remnant DEM L241, and this binary was previously classified as a high mass X-ray binary where the optical companion is a O5III(f) star. The source has also been detected at very high energies with the H.E.S.S. gamma-ray telescope, though in only one phase bin. We have used the High Resolution Spectrograph (HRS) with the Southern African Large Telescope (SALT) to obtain the best binary solution so far for this source, showing that source is slightly eccentric (~ 0.4) and constrained the phases of superior and inferior conjunction. The Fermi-LAT and H.E.S.S. results are discussed in relation to the new binary solution.

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