

Abstract of thesis entitled

**GAMMA-RAY SPECTRAL ANALYSIS  
OF THREE ENERGETIC  
MILLISECOND PULSARS**

Submitted by

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PSRs J0218+4232, B1821–24 and B1937+21 are among the most energetic and fastest-spinning millisecond pulsars (MSPs). They have been studied in radio, X-rays and gamma-rays, and show aligned pulse profiles in all the bands. The *Fermi* LAT Pass 8 data was published in 2015 and has lots of advantages over the old Pass 7 data, such as increased effective area, wider energy range, and improved event reconstruction. Since the recent gamma-ray spectral analyses of the three MSPs are relatively old, I redo the gamma-ray spectral analyses of the three MSPs with four-year more *Fermi* LAT observational data and

newly published *Fermi* LAT Pass 8 data. I obtain better fit results for the gamma-ray spectra of the three MSPs with smaller error bars and larger test statistic values. I also do numerical simulations to test the two-layer model using the new *Fermi* LAT data. By minimizing the differences between the predictions of the two-layer model and the observational data, I obtain the best-fit values of the three independent parameters of the two-layer model. It is discovered that the simplified two-layer model can predict the broadband spectra of the three MSPs which are very close to the observational data in gamma-rays (*Fermi* LAT) and X-rays (*NuSTAR*).

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