

## Detection of molecular clouds in the Vela X region by the NANTEN telescope and study of the interaction between the clouds and the pulsar-wind nebula

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Observation with an arc-minute scale resolution of dense molecular clouds located at pulsar-wind nebulae (PWNe) is important to study the interaction between the interstellar gas and PWN and the evolution of the complex morphology of PWNe, as noted in some previous literature. Our study performs the first dedicated research of the molecular clouds located at Vela X, the large PWN around the Vela pulsar, by analyzing the  $^{12}\text{CO}(J=1-0)$  line emission data given by the NANTEN telescope. Thanks to the close vicinity of Vela X (290 pc from the solar system) and the good angular resolution of  $2.6'$  of the NANTEN telescope, our study successfully detects the molecular clouds resolved into a sub-pc physical scale. The distribution of the clouds is found to be well correlated with the morphology of the TeV gamma-ray emission of Vela X detected by H.E.S.S., supporting their interaction with the PWN. The presentation gives comparisons between the morphology of the PWN and the distribution of interstellar gas covering a broad range of wavelengths from radio to TeV gamma rays and discusses the role of the interstellar gas in Vela X including potential acceleration of hadronic cosmic rays in the PWN.

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