

## RESEARCH IN PHYSICS AND ASTRONOMY

The physics and astronomy faculty are involved in cutting-edge research, funded by external grants, and involving undergraduate student researchers. We have programs that look to the heavens, others that probe materials on the nanoscale, and even some that look into the interior of nuclei. Below is a list of research topics in each area. Click on the links on the left to get more information, but most of all, [get involved!](#) You can make meaningful contributions to the progress of science.



[Observational Astronomy](#)



[Atmospheric Physics](#)



[Computational Condensed Matter](#)



[Nuclear & Particle Physics](#)



[Nanoscience](#)

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### Observational Astronomy

- Supermassive-Star/Black-Hole Binary System [Hillwig]
  - Central Stars in Planetary Nebulae [Hillwig]
  - Observational Studies of Evolved Stars [Hrivnak]
  - Observational Studies of Interacting Binary Stars [Hrivnak]
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### Atmospheric Physics

- Ozone pollution around the globe: from the Great Lakes Region, to southeast Texas, from China to Japan [Morris]
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### Computational Condensed Matter Physics

- Calculating the electronic structure of molecules and clusters of atoms: catalysis using vanadium oxide [Zygmunt]
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### Nuclear & Particle Physics

- Examining how the proton gets its spin (STAR-spin experiment at RHIC) [Koetke, Manweiler, Stanislaus]
  - Does the neutron have an electric dipole moment? [Koetke, Stanislaus]
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### Nanoscience

- Using x-rays to watch proteins adsorb onto nano-thin films and surfaces [Richter]
- Building thin, porous, polymer shells and films for sensor and drug delivery applications [Richter]

- Research in Physics & Astronomy - Valparaiso University
- Using neutron scattering to determine structure of nanoparticles [Richter]

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