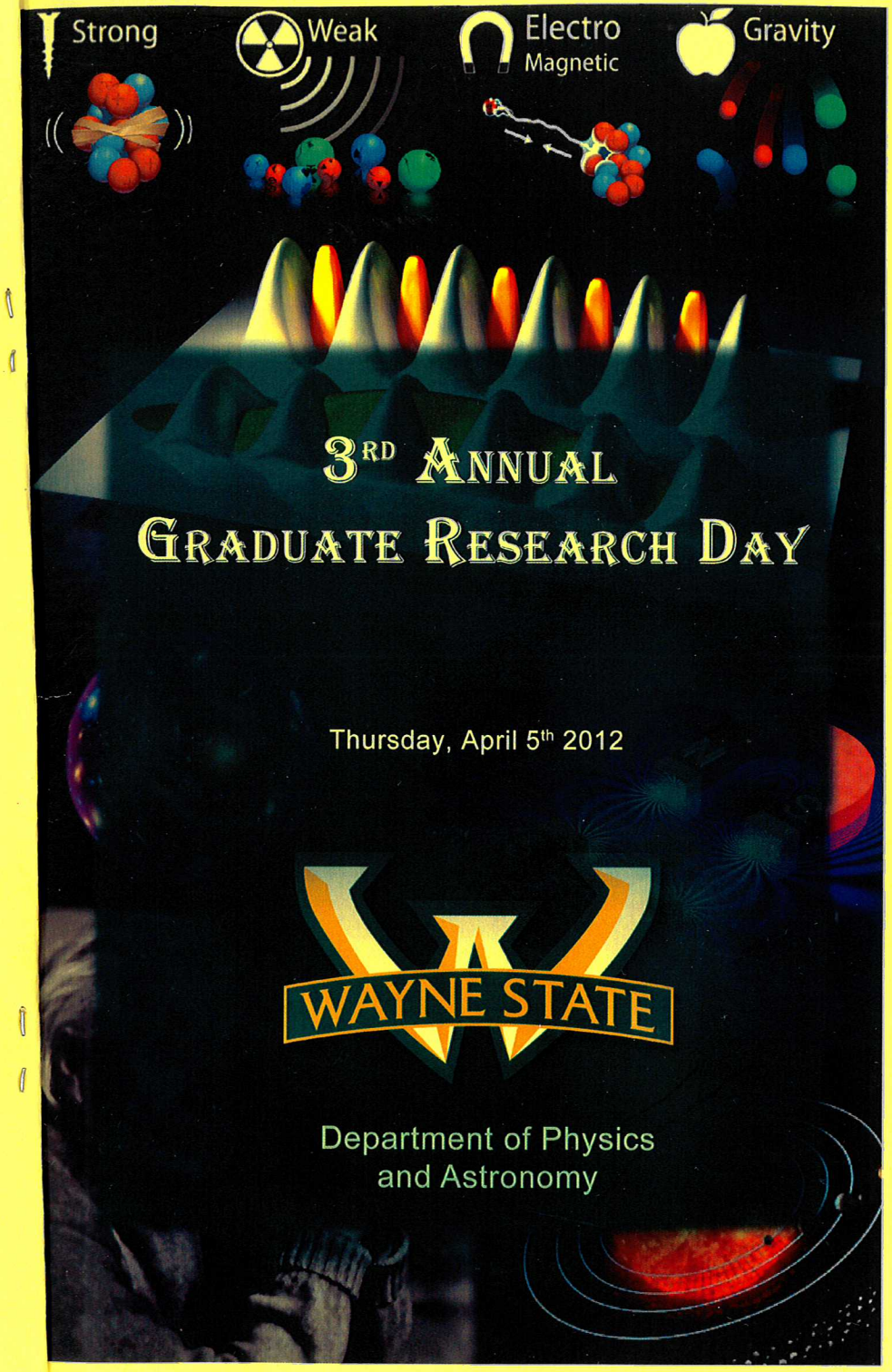
Welcome to the 3rd Annual Graduate Research Day!

Physics Graduate Research Day provides an informal atmosphere for students to interact with each other and learn about research in the department that is outside their specialization. Dr. Sultana Nahar, a prominent researcher at the Ohio State University and a former WSU Physics graduate (Ph.D. 1987) is our guest speaker this year, talking about "X-ray Spectroscopy, from black holes to cancer treatment". A few current graduate students will be giving oral presentations on their research activity, and 18 students will be presenting research posters.



Organizing Committee

Student Organizers

- Suneetha Devpura
- Champika Gamage
- Indermeet Kohli
- Akila Kumarasiri
- Vera Loggins
- Peng Zhou

Faculty Advisors

- Dr. Giovanni Bonvicini
- Dr. Ashis Mukhopadhyay

Special thanks to

Dr. Sultana N. Nahar, guest speaker
Ohio State University

Robert L. Thomas
Dean of College of Liberal Arts & Sciences

Dr. Ratna Naik
Chair: Department of Physics & Astronomy

Dr. Gil Paz
Dr. Jogindra Wadehra

Staff Members

- Delores Cowen
- Shere Davis
- Doris King

Schedule

9:30 - 10:00 am: Refreshments and opening statements

10:00 - 11:50 am - Graduate Student Oral Presentations

10:00 - 10:20 am - Akila Kumarasiri, *"Effect of Transition Metal Doping on Multiferroic ordering in $Ni_3V_2O_8$"*

10:20 - 10:40 am - Peng Zhou: *"Analysis of D^+ to $K^+K^-\pi^+\pi^0$ in CLEO-c"*

10:40 - 11:00 am - Suneetha Devpura, *"Investigation of Neuroblastoma and Ganglioneuroma Child Tumors using Raman Spectroscopy"*

11:10 - 11:30 am - Kristopher Healey, *"Dark Matter Contributions to Leptonic B Decays"*

11:30 - 11:50 am - Ming-Wei Lin, *"The Electrical Transport Study of Suspended Graphene Nanoribbons"*

1:30 am - 3:30 pm: Poster Session

3:30 - 4:30 pm - Guest Speaker: Dr. Sultana N. Nahar, Ohio State University
"X-ray Spectroscopy, from Black Holes to Cancer Treatment"

4:30 - 5:00 pm: Round Table discussion with guest speaker

5:00 – 6:00 pm: Pizza Dinner and Awards Ceremony

Guest Speaker

Dr. Sultana N. Nahar

Senior Research Scientist, Ohio State University

"X-ray Spectroscopy, from black holes to cancer treatment"

Physics is applied to many areas of science and hence plays a crucial role in multidisciplinary programs. I will discuss that the physics of X-rays applied to study astronomical objects, such as black holes, can also be used in efficient treatment of cancer. A black hole is detected through the hard X-rays emitted by highly charged ions near it. On the other hand, the high energy X-rays absorbed by the nanoparticles embedded in a cancerous tumor can cause ejection of electrons that destroy the surrounding malignant cells. However, in the current medical applications, use X-rays also introduce considerable damage. Our method predicts a most effective treatment through X-ray spectroscopy.

Graduate Student Speakers

Akila Kumarasiri

Advisor: Dr. Gavin Lawes

"Effect of Transition Metal Doping on Multiferroic ordering in $Ni_3V_2O_8$"

There is considerable interest in understanding the materials properties underlying the development of simultaneous magnetic and ferroelectric order in multiferroics. $Ni_3V_2O_8$ develops strongly coupled ferroelectric and antiferromagnetic order simultaneously at low temperatures and has a rich magnetic phase diagram due to competing magnetic interactions. We investigated how the magnetic phases of $Ni_3V_2O_8$ were affected by systematic doping by both non-magnetic (Zn) and magnetic (Cu, Co, Fe, Mn) transition metal ions. On doping with spin-0 Zn, the system behaves as expected for site dilution consistent with 2-D spins, while modifications to the phase diagram for magnetic dopants (Co, Cu, Mn and Fe) show more variation, but the multiferroic phase transition appears to persist over a range of concentrations. This suggests that the specific spin structure in $Ni_3V_2O_8$ responsible for the development of ferroelectric order is relatively robust against perturbations produced by both magnetic and non-magnetic dopants.

Peng Zhou

Advisor: Dr. Giovanni Bonvicini

"Analysis of D^+ to $K^+K^-\pi^+\pi^0$ in CLEO-c"

Using 818pb^{-1} of CLEO-c data at √s =3770 MeV, we measure precisely the branching ratios for four $D^+ \rightarrow K^+K^-X$ hadronic channels. Our measurement improves the errors of B($D^+ \rightarrow$