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# DEPARTMENT OF PHYSICS

April 25

Zoom Undergraduate Oral Sessions (meeting ID # 650-402-442)  
Faculty mentors: Dr. Matthew Caplan, Dr. Xing Fang, Dr. Rainer Grobe,  
Dr. Daniel L. Holland, Dr. Uttam Manna, Dr. Epaminondas Rosa Jr.,  
Dr. George H. Rutherford, and Dr. Q. Charles Su

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## Session 1

8:00-8:15

**Jack Yost (Fang, Grobe, Su)**

MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE APPLIED TO ACOUSTICS

8:15-8:30

**Chi Gong (Grobe, Su)**

DIRAC VACUUM CAN RESOLVE RAPIDLY CHIRPED EXTERNAL FIELDS

8:30-8:45

**Cassie N. McGinnis (Holland, Grobe, Su)**

UNIVERSAL SCALING LAWS FOR OPTIMALLY EXCITED NONLINEAR OSCILLATORS

8:45-9:00

**Austin Penwell (Grobe, Su)**

TRANSITION BETWEEN COHERENT AND INCOHERENT CHIRPING MECHANISMS IN  
ELECTRON-POSITRON PAIR CREATION

9:00-9:15

**Bailey Wilkinson (Manna)**

MULTIPOLAR DECOMPOSITION OF OPTICAL SPECTRA OF HIGH-INDEX DIELECTRIC  
NANOPARTICLES

9:15-9:30

**Brighton Coe (Manna)**

EXCITATION OF ELECTRODYNAMIC ANAPOLE MODES IN DIELECTRIC NANOSPHERES

9:30-9:45

**Jonathan Sullivan-Wood (Holland)**

EFFECTS OF DIAMAGNETISM ON MAGNETOTAIL CURRENT SHEET EQUILIBRIUM

**break 9:45am-10:00 am**

## Session 2:

10:00-10:15

**Julian Jovanovich (Caplan)**

STUDYING "NUCLEAR PASTA" IN NEUTRON STARS THROUGH 3-D PRINTING

**10:15-10:30**

**Brighton Coe (Caplan)**

SIMULATED MULTIFRAGMENTATION OF NUCLEAR COLLISIONS

**10:30-10:45**

**John Miles (Caplan)**

SIMULATING THE ORBITAL PRECESSION OF COMETS

**10:45-11:00**

**James Brokaw (Caplan)**

NATURE OF NEUTRON STAR CRUSTS

**11:00-11:15**

**Cal Forsman (Caplan)**

THERMAL FLUCTUATIONS IN NUCLEAR PASTA

**11:15-11:30**

**Ian Freeman (Caplan)**

MODELING NUCLEI FOR SIMULATED NUCLEAR COLLISIONS

**break 11:30-11:45 pm**

**Session 3:**

**11:45-12:00**

**Sean Comben (Grobe, Su)**

EXTERNAL FIELD APPROXIMATION FOR THE BREIT-WHEELER PROCESS?

**12:00-12:15**

**Luis Rizo (Fang, Grobe, Su)**

THE EXACT PREDICTABLE FUNCTIONS BY A SINGLE NEURON

**12:15-12:30**

**Jordan Bryan (Grobe, Su)**

SYMBIOTIC VS. NON-SYMBIOTIC OPTIMIZATION FOR SPATIAL AND TEMPORAL DEGREES OF FREEDOM IN PAIR CREATION

**12:30-12:45**

**Ian Freeman (Rosa)**

TEMPERATURE EFFECTS ON NEURONAL ACTIVITIES

**12:45-01:00**

**Jordan Brandt-Trainer (Rutherford, Rosa)**

EXPLORING THE HODGKIN-HUXLEY NEURON MODEL WITH CIRCUIT BOARDS

**1:00 The End of the Physics Zoom Oral Sessions**