

# **Celebrating 75 Years of the Nuclear Shell Model and Maria Goeppert-Mayer**



## **Report of Contributions**

Contribution ID: 1

Type: **not specified**

## **A brief history of a big idea for a small thing**

*Friday, July 19, 2024 9:30 AM (35 minutes)*

**Presenter:** JOHNSON, Calvin (San Diego State University)

**Session Classification:** Introductory Session

Contribution ID: 2

Type: **not specified**

## **Development and Applications of the ab initio No-Core Shell Model**

*Friday, July 19, 2024 10:05 AM (35 minutes)*

**Presenter:** VARY, James (Iowa State University)

**Session Classification:** Introductory Session

Contribution ID: 3

Type: **not specified**

## Welcome

*Friday, July 19, 2024 9:15 AM (15 minutes)*

**Presenter:** HAFIDI, Kawtar (Argonne National Laboratory)

**Session Classification:** Introductory Session

Contribution ID: 4

Type: **not specified**

## **Microscopic effective interactions for the nuclear shell model**

*Friday, July 19, 2024 1:50 PM (25 minutes)*

**Presenter:** SMIRNOVA, Nadya (GANIL)

**Session Classification:** Invited Talks

Contribution ID: 5

Type: **not specified**

## **Quest for a comprehensive shell model to track the evolution in nuclear structure**

*Friday, July 19, 2024 1:00 PM (25 minutes)*

**Presenter:** LUBNA, Rebeka (FRIB)

**Session Classification:** Invited Talks

Contribution ID: 6

Type: **not specified**

## **Overview of the History of the Nuclear Shell Model and Personal Perspectives on its Future**

*Friday, July 19, 2024 1:25 PM (25 minutes)*

**Presenter:** DRAAYER, Jerry (LSU)

**Session Classification:** Invited Talks

Contribution ID: 7

Type: **not specified**

## **The Nilsson Model and Medium-Mass Nuclei**

*Friday, July 19, 2024 2:15 PM (25 minutes)*

**Presenter:** CRAWFORD, Heather (LBNL)

**Session Classification:** Invited Talks



Contribution ID: 8

Type: **not specified**

## **Towards a microscopic understanding of the shell model: status and open questions**

*Friday, July 19, 2024 3:00 PM (25 minutes)*

**Presenter:** STROBERG, Ragnar (ND)

**Session Classification:** Invited Talks

Contribution ID: 9

Type: **not specified**

## **Applications of the ab initio no-core shell model**

*Friday, July 19, 2024 3:25 PM (25 minutes)*

**Presenter:** NAVRATIL, Petr (TRIUMF)

**Session Classification:** Invited Talks

Contribution ID: 10

Type: **not specified**

## **Large-scale shell-model calculations, quasi-particle shell model, and their applications**

*Friday, July 19, 2024 3:50 PM (25 minutes)*

**Presenter:** SHIMIZU, Noritaka (University of Tsukuba)

**Session Classification:** Invited Talks

Contribution ID: 11

Type: **not specified**

## **Structure and reaction observables of drip-line nuclei with the Gamow Shell Model**

*Friday, July 19, 2024 4:25 PM (25 minutes)*

**Presenter:** MICHEL, Nicolas (Institute of Modern Physics, Lanzhou)

**Session Classification:** Invited Talks

Contribution ID: 12

Type: **not specified**

## **Pushing the limits of the shell model towards the continuum**

*Friday, July 19, 2024 5:15 PM (25 minutes)*

**Presenter:** KRAVVARIS, Kostas (LLNL)

**Session Classification:** Invited Talks

Contribution ID: 13

Type: **not specified**

## **Nuclear statistical properties by shell model Monte Carlo**

**Presenter:** ALHASSID, Yoram (Yale University)

**Session Classification:** Invited Talks

Contribution ID: 14

Type: **not specified**

## **Celebrating Maria Goeppert twice: shell model and double beta decay**

*Saturday, July 20, 2024 9:00 AM (25 minutes)*

**Presenter:** MENENDEZ, Javier (University of Barcelona)

**Session Classification:** Invited Talks

Contribution ID: 15

Type: **not specified**

## The shell structure of the neutron-rich Ca isotopes

*Saturday, July 20, 2024 9:25 AM (25 minutes)*

**Presenter:** DOORNENBAL, Pieter (RIKEN)

**Session Classification:** Invited Talks



Contribution ID: 16

Type: **not specified**

## Deconstructing the $g_A$ puzzle within the realistic shell model

*Saturday, July 20, 2024 9:50 AM (25 minutes)*

**Presenter:** CORAGGIO, Luigi (Università degli Studi "Luigi Vanvitelli" - INFN Naples)

**Session Classification:** Invited Talks

Contribution ID: 17

Type: **not specified**

## **Ab initio studies on muon capture to probe neutrinoless double-beta decay**

*Saturday, July 20, 2024 10:15 AM (25 minutes)*

**Presenter:** JOKINIEMI, Lotta (TRIUMF)

**Session Classification:** Invited Talks

Contribution ID: 18

Type: **not specified**

## **Shell model meets in-beam gamma-ray spectroscopy on both sides of the nuclear chart**

*Saturday, July 20, 2024 11:00 AM (25 minutes)*

**Presenter:** GADE, Alexandra (Facility for Rare Isotope Beams, Michigan State University)

**Session Classification:** Invited Talks

Contribution ID: 19

Type: **not specified**

## **Nuclear Data in the Cosmos from the Interacting Shell Model**

*Saturday, July 20, 2024 11:25 AM (25 minutes)*

**Presenter:** KARAMPAGIA, Sofia (Grand Valley State University)

**Session Classification:** Invited Talks

Contribution ID: 20

Type: **not specified**

## **Frontiers in explosive nuclear astrophysics**

*Saturday, July 20, 2024 11:50 AM (25 minutes)*

**Presenter:** LOTAY, Gavin (University of Surrey)

**Session Classification:** Invited Talks

Contribution ID: 21

Type: **not specified**

## **No-Core Shell Model densities and *ab initio* effective potentials for elastic nucleon-nucleus scattering**

*Saturday, July 20, 2024 2:35 PM (25 minutes)*

**Presenter:** ELSTER, Charlotte (Ohio University)

**Session Classification:** Celebrating Women in Physics

Contribution ID: 22

Type: **not specified**

## **No Nus is Good News: From the Origin of Matter, to the Rarest Radioactive Decay in the Universe**

*Saturday, July 20, 2024 3:00 PM (25 minutes)*

**Presenter:** ROGERS, Leslie (Argonne National Laboratory)

**Session Classification:** Celebrating Women in Physics

Contribution ID: 23

Type: **not specified**

## **Journey into Biological Materials**

*Saturday, July 20, 2024 3:25 PM (25 minutes)*

**Presenter:** PATTESON, Alison (Syracuse University)

**Session Classification:** Celebrating Women in Physics



Contribution ID: 24

Type: **not specified**

## **Nuclear Issues in National Security**

*Saturday, July 20, 2024 3:50 PM (25 minutes)*

**Presenter:** HUTTON, Rhiannon (Institute for Defense Analyses)

**Session Classification:** Celebrating Women in Physics

Contribution ID: 25

Type: **not specified**

## **Spin-Orbit Splittings in the Presence of Weak Binding**

*Sunday, July 21, 2024 9:30 AM (25 minutes)*

**Presenter:** KAY, Benjamin (Argonne National Laboratory)

**Session Classification:** Invited Talks

Contribution ID: 26

Type: **not specified**

## **Isospin Symmetric Island of Inversion at the $N=Z$ line**

*Sunday, July 21, 2024 9:55 AM (25 minutes)*

**Presenter:** NOWACKI, Frederic (Institut Pluridisciplinaire Hubert Curien, Strasbourg)

**Session Classification:** Invited Talks

Contribution ID: 27

Type: **not specified**

## **Some aspects of the quenching of single-particle strength**

*Sunday, July 21, 2024 10:20 AM (25 minutes)*

**Presenter:** MACCHIAVELLI, Augusto (Oak Ridge National Laboratory)

**Session Classification:** Invited Talks

Contribution ID: 28

Type: **not specified**

## **Ab Initio Investigation of Radiative Capture and Electron-Positron Pair Production**

*Sunday, July 21, 2024 11:00 AM (25 minutes)*

**Presenter:** GYSBERS, Peter (Facility for Rare Isotope Beams, Michigan State University)

**Session Classification:** Invited Talks

Contribution ID: 29

Type: **not specified**

## **Beta decay recoil-order terms for studies of physics beyond the Standard Model**

*Sunday, July 21, 2024 11:25 AM (25 minutes)*

**Presenter:** SARGSYAN, Grigor (Facility for Rare Isotope Beams, Michigan State University)

**Session Classification:** Invited Talks

Contribution ID: 30

Type: **not specified**

## **Ab initio theory towards reliable neutrinoless double beta decay nuclear matrix element**

*Sunday, July 21, 2024 11:50 AM (25 minutes)*

**Presenter:** BELLEY, Antoine (TRIUMF)

**Session Classification:** Invited Talks

Contribution ID: 31

Type: **not specified**

## Shell Model for double beta decay

*Friday, July 19, 2024 4:50 PM (25 minutes)*

**Presenter:** HOROI, Mihai (Central Michigan University)

**Session Classification:** Invited Talks



Contribution ID: 32

Type: **not specified**

## **Elucidating the Ge nuclei with the shell model**

*Sunday, July 21, 2024 2:45 PM (25 minutes)*

**Presenter:** PETERS, Erin (University of Kentucky)

**Session Classification:** Invited Talks

Contribution ID: 33

Type: **not specified**

## Quantum Computing and the Shell Model

*Sunday, July 21, 2024 1:15 PM (25 minutes)*

**Presenter:** ENGEL, Jon (University of North Carolina)

**Session Classification:** Invited Talks

Contribution ID: 34

Type: **not specified**

## **Neural network quantum states for the nuclear many-body problem**

*Sunday, July 21, 2024 1:40 PM (25 minutes)*

**Presenter:** LOVATO, Alessandro (Argonne National Laboratory)

**Session Classification:** Invited Talks

Contribution ID: 35

Type: **not specified**

## **A weak entanglement approximation for nuclear structure: proton-neutron approximate shell model**

*Sunday, July 21, 2024 2:05 PM (25 minutes)*

**Presenter:** GORTON, Oliver (Lawrence Livermore National Laboratory)

**Session Classification:** Invited Talks

Contribution ID: 36

Type: **not specified**

## **Nuclear shapes studied by Monte Carlo shell model calculations**

*Sunday, July 21, 2024 3:35 PM (25 minutes)*

**Presenter:** TSUNODA, Yusuke (Center for Nuclear Study, University of Tokyo)

**Session Classification:** Invited Talks

Contribution ID: 37

Type: **not specified**

## Maria Goeppert Mayer –From Göttingen to the Nobel Prize in Physics

*Friday, July 19, 2024 11:00 AM (1 hour)*

The talk will present an overview of Maria Goeppert-Mayer's life and her accomplishments in physics. Being trained in quantum theory at the famous Göttingen school of Max Born, she became friends with many of the most influential physicists of the early 20th century. Albeit, as a woman and the wife of Joseph Mayer, she was considered unemployable in the United States, after her emigration from Germany. Nevertheless, she continued working as unpaid lecturer and made several substantial contributions to atomic and molecular physics. Collaborating with Edward Teller during World War II, she shifted her focus to nuclear physics, particularly to the field of nuclear astrophysics. Her research on the correlation between stellar abundances and the numbers of protons or neutrons in a nucleus, led her to the identification of magic numbers. Despite being dismissed by many physicists, her exploration into "numerology" ultimately led to the recognition of the shell structure of the nucleus. In 1963, she was honored with the Nobel Prize for her groundbreaking discovery.

**Presenter:** WIESCHER, Michael (University of Notre Dame)

**Session Classification:** Colloquium

Contribution ID: **38**

Type: **not specified**

## Welcome

*Saturday, July 20, 2024 2:30 PM (5 minutes)*

**Presenters:** BISSOLOTTI, Chiara (Argonne National Laboratory); KIM, Young-Kee (University of Chicago)

**Session Classification:** Celebrating Women in Physics

Contribution ID: 39

Type: **not specified**

## **Level Densities and Gamma-Ray Strength Functions in Heavy Nuclei with Shell-Model Monte Carlo**

*Sunday, July 21, 2024 3:10 PM (25 minutes)*

**Presenter:** DEMARTINI, Dallas (Yale University)

**Session Classification:** Invited Talks