

Proposal on the Attendance of the 2019 Meeting of the American Physical Society Division of Nuclear Physics

[REDACTED]

From October 14 - October 17 of 2019, the 2019 Meeting of the American Physical Society Division of Nuclear Physics (DNP) will be held in Crystal City, outside of Washington DC. This event will be hosted locally by George Washington University. This is an annual, nationally-scoped conference for experts who specialize in nuclear physics of all flavors, ranging from nuclear astrophysics to nuclear structure. My own research is somewhere between these two extrema. I study so-called *giant resonances*, which are collective phenomena allowing one to study the base and fundamental properties of bulk nuclear matter itself. This conference, being topical and yet broadly-scoped within the very-large field of nuclear physics, will allow me to acquire targeted feedback from both professionals who study [REDACTED] as well as by nuclear theorists specializing in the formation and dynamics of stars, who can speak to the implications of my measurements on an astrophysical scale.

My thesis is focused on studying the compressional mode giant monopole resonance (GMR) in nuclei so as to extract information about how incompressible nuclear matter is (K_∞), thereby giving insight to the shape and structure of the equation of state. **The general idea is analogous to how one can drive a child that is on a swing to great heights by pushing the child at just the right frequency; if one excites a nucleus with just the right energy, E_{GMR} , it will undergo strong radial oscillations, classically similar to a ball rapidly inflating and deflating by small amounts, and hence undergoing rapid volume — and in the nuclear case, density — fluctuations.** Measurements of E_{GMR} for a nucleus directly allows one to extract the *incompressibility*, K , of that particular nucleus. One can then use the experimental extraction as theoretical input to determine the properties of bulk-nuclear matter, such as to determine K_∞ . Since these types of oscillations are very collective, it is generally the case that the energies (or frequencies) with which they oscillate tend to follow well-defined trends with respect to the number of protons and neutrons that constitute the nuclear system; typically, the heavier the nucleus, the lower the resonance frequency that is experimentally observed. It was thus extremely intriguing when a contemporary group reported an *increase* in the frequency when one increased the number of neutrons in the calcium isotopes — manifesting in a positive, rather than negative, value of a quantity deemed K_τ which contributes to the value of K_∞ . Such a fact would, if found to be true, have veritable affect on the nuclear theory which predicates much of our understanding of collective excitations in nuclear systems.

A portion of my dissertation is focused on reconciling this open problem. In November of 2018, I completed a comprehensive experiment extracting E_{GMR} for four calcium nuclei within a single measurement, with the hopes of minimizing systematic errors. **To this end, I am one of the presenting authors who** [REDACTED]

[REDACTED] The results of this measurement are highly anticipated by the giant resonance community; in particular, [REDACTED] of Florida State University [REDACTED] — has provided us with theoretical calculations that we hope to discuss at the conference, and the contemporary group from [REDACTED] will be in attendance to discuss the discrepancies between our results. Furthermore, my own experimentalist collaborators on this project, such as [REDACTED] from the University of Tokyo, will provide invaluable assistance as we prepare these results for imminent submission to Physical Letters B and the Physical Review. This is indeed, “the” conference for nuclear physicists, and thus this is a meeting to which my attendance is essential. I plan to defend my thesis in April of 2020, and so I will be acquiring a flavor for the types of positions available for me in the job market beyond academia and networking with the myriad industrial recruiters who attend these conferences.

Owing to funding constraints by the [REDACTED] of which I am a member, it is presently unclear if I will be able to attend the conference. There is a group van driving to DC; however, it is possible that due to teaching commitments I may not be able to stay for the length of time the van intends to

be traveling (Sunday to Friday). Airfare would likely be in the vicinity of \sim \$500, and the difference in hotel lodging costs would nonetheless very nearly favor a shorter trip with a flight cost of that magnitude. I am exploring however the option of using instead an Amtrack line which will be at least \$200 cheaper than the flight alternative, if not more. [REDACTED] the majority of [REDACTED] members attending the conference seem to be pursuing the conference hotel, which has a rate of \$250/night. I will be endeavoring to persuade individuals to stay at an AirBnB which is \sim \$100/night (for a two bedroom condo). This would reduce costs substantially.

My dates of travel are not yet fixed. However, my talk is scheduled for [REDACTED] I plan to attend the first days of the conference, when the professional development opportunities are the most ample. This suggests leaving October 14 and returning on October 16, to save costs. Anthony Travel, the university travel agency, has confirmed that the cost would be similar or cheaper for my traveling there individually. I also have found some cheap Amtrack train service which yields discounts for larger groups; I am thus endeavoring to find individuals to travel with. I am quite aware that the CPG cannot cover a majority of my delineated expenses for the duration of the conference. However, my hope is that some of the cost of the conference registration or airfare might be defrayed. In any case, whatever consideration or support the committee can offer to my professional development is appreciated.

Expense	Approximate \$ Figure (USD)	Explanation
Travel	(300)	Estimated ^a
Travel to Hotel	(50)	Uber from train station (possibly shared with others)
Lodging	(125)	at 100 USD/night/2 people \times 2 nights + service fee ^b
Registration	200	Student rate
Meals	63	\$76/day \times (1 day + 2 travel days/3)
Subtotal	738	
Total Need	(738)	Any contribution is appreciated!

^a I cannot confirm my attendance until I have a better idea of my funding situation

^b In the event that I cannot find a roommate for the AirBnB, this could raise to \$250 if I split the hotel room with another at the conference venue; nonetheless, that would be in excess of the generosity of the GSU CPG and is somewhat a moot scenario.

TABLE I. Parenthetical quantities are approximate and unconfirmed as of the date of the proposal submission.