



When I walked into Dr. Michael Wadness' classroom for the first time in 2016, I wasn't expecting to emerge with a completely different outlook on physics. As a budding sophomore, I was experimenting with interests and passions, mostly in science. For my science fair project that year, I decided to explore special relativity, and I took some of the questions I had about the subject to Dr. Wadness. Despite the fact that I wasn't his student, he graciously took the time to answer my elementary questions. His explanations and answers were thorough, simple, and generally fantastic—something I found to be consistently true of his teaching when I eventually took his AP Physics class. But my curious eye was drawn to what some of his students were doing in the back of the room. I watched quietly as they assembled a large, stacked structure, attached to enough tape, wires, and circuit boards to intrigue my younger self. Dr. Wadness and his students explained that what they were building was called a “cosmic ray detector”, and it was capable of measuring the quantity and velocity of hundreds of thousands of invisible particles that pass through the atmosphere, our bodies, and the Earth. These particles originated in outer space, far, far away, and ended their enormous journey by smacking into electrons inside of the detector. As I watched the LCD counter rocket upwards, I felt the stirrings of an immense fascination with the physics of the very small, the very fast, and the very far away.

A year later, when I had taken that fascination and turned it into an astrophysical science fair project, I approached Dr. Wadness once more with my eagerness to learn more about the mysterious world of particle physics. Despite a complete lack of preparation, he welcomed me into a group of students learning rudimentary particle physics, practicing for the annual QuarkNet Masterclass at Northeastern. Needless to say, the class doubled my interest in the subject. Despite knowing that the class remained essentially the same from year to year, I decided to go my senior year as well, just to recapture that magical rush that comes from characterizing the invisible and collaborating with people from around the world. The feeling never got old, and it inspired me to firmly declare a physics/math double major before I had even begun my first semester in college. It inspired me to jump head first into real-world particle physics research. Thanks to QuarkNet and the science faculty at Medford High, I went from learning about leaders in particle physics to working side by side with them in just a few short months.

Joseph Farah  
University of Massachusetts Lowell

*Mr. Farah is a former student of:  
Dr. Michael Wadness  
Medford High School  
Medford MA  
Northeastern and Brown Universities center*



**QuarkNet**

**Stories from the classroom**

*Dr. Wadness writes:*

*Joe is a freshman at UMass Lowell and doing ATLAS work at Harvard. All he did was hustle his student QuarkNet experiences.*



**ATLAS NOTE**

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### **All the sparks we cannot see**

J. Farah<sup>a</sup>, N. Felt<sup>a</sup>, M. Franklin<sup>a</sup>, P. Giromini<sup>a</sup>, J. Phillion<sup>a</sup>, A. Tuna<sup>a</sup>, A. Wang<sup>a</sup>

<sup>a</sup>*Harvard University, Cambridge, Massachusetts 02138, USA*

#### **Abstract**

We found a remedy that stops the massive VMM casualties suffered when operating the Harvard Micromegas octuplet with high voltage. For sake of curiosity, we went after the silent killer and found a lot of circumstantial but not direct evidence of arc discharges along the resistive strips fed by the applied positive voltage.