



In Memory of Ken Shoulders

Ken Shoulders, best known in the new energy field for his work with charge clusters (EVOs, exotic vacuum objects), passed away on June 7 at the age of 86.

In *IE* #61, we published Shoulders' important paper, "Charge Clusters in Action." Bill Zebuhr's editorial in that issue (<http://www.infinite-energy.com/iemagazine/issue61/chargeclusters.html>) celebrated the then 25 years of investigations performed by Shoulders and briefly outlined how Shoulders evolved to working in the new energy field: "Ken has a history of working at the edge of science and engineering. He worked at SRI International for ten years as a staff scientist and started a field now called vacuum nanoelectronics, which is based on field emission active devices. He also worked at MIT (during this time he fabricated the world's first microcircuits) and later did some exotic and confidential work for the CIA and others."

Dr. Michael McKubre met Shoulders at SRI long before either of them became involved in the new energy field. McKubre highlighted Shoulders' early career: "Ken Shoulders was already a legend in 1978 when I arrived at SRI. Although credit is rarely given, Ken invented the Quadrupole Mass Spectrometer (QMS) that today is probably the predominant means of determining charge:mass ratios. It is widely used in the LENR world. In 1958 Ken built at SRI the first 12 QMS instruments to exist. He told me much later that he invented it to solve a technical problem; once solved he moved on and others at SRI were responsible for the development of the commercial instrument. The QMS was just one of Ken's accomplishments."

Zebuhr wrote of Shoulders' charge clusters: ". . . [they] are compact groups of electrons. They defy the common belief that such things cannot occur because of the great repelling forces these electrons should exert on each other. Yet they do appear to exist and are not even that difficult to create, once you know how. . . Not only are the clusters themselves exotic to mainstream science but they seem to offer a way of connecting to the most fundamental and universal element of existence, sometimes called the aether. . . This is a very powerful concept and may well be the foundation of any device that operates with an 'efficiency' over-unity."

Don Hotson emphasized Shoulders' experimental approach: "Over the course of at least ten years of occasional meetings and many discussions, I remember Ken as the most meticulous and original experimenter with whom I have ever been in contact. His discoveries about condensed matter will revolutionize several fields, probably including definite proof of the negative energy sea by which we are surrounded."

Hotson noted that a few years ago he offered Shoulders a "partial, possible explanation for the EVO phenomenon" and at the time Shoulders said "it was the best explanation" he had heard. Hotson wrote: "The major mystery of the EVO is how can that immense a number of electrons coexist in the tiny dimensions of the EVO? Shouldn't it simply

explode, with all those negative charges packed together? I suggest that Dirac's equation might give a partial explanation. In this, positive and negative charges reciprocate, one changing to the other 10^{24} times a second. I suggest that energetic electrons, enclosed within Ken's tiny membrane, would rapidly strike the membrane and be reflected. But they would be reflected out of phase, so that plus charge changed to minus charge, electron to positron, so that at any time half the entities within the membrane would be electrons, the other half positrons. But electron and positron annihilate each other, you object. Why doesn't that just happen, with great outpouring of high-frequency photons? Well, electron and positron annihilation isn't the simple procedure we imagine it to be. They don't just come together and go poof. They first must orbit each other at a considerable distance (I believe the width of the electron orbit in the hydrogen atom) until they reach a certain balance, emit a high-frequency photon containing all of their positive energy and drop together into the electron positron sea. But in the tiny confines of the EVO, they don't have the space or the time to perform that necessary little dance, so they continue, an immensely dense and powerful package of charges, until they hit something, burrowing into it while releasing all their immense pent-up energy."

McKubre highlighted Shoulders' approach to science: "Ken Shoulders was an inventor's inventor. He worked only with his own hands and trusted his own judgment exclusively, and then only after exhaustive empirical testing and retesting. What he knew, he knew with certainty, and was very impatient with the modern academic tendency to draw global conclusions from a single experimental result (or worse, no experiment or result at all). One of the things that Ken knew was so unexpected and so universally dismissed that I spent considerable time with him in his home/laboratory to try and understand it too. Ken *knew* that under conditions that he could recreate reliably electrons collected in Avogadro scale numbers against their collective negative charge. The Coulomb barrier of two positive charges is often cited against 'cold fusion' and is certainly a real barrier to 'hot fusion.' Yet Ken could wield the power and measure the properties of clusters of more than 10^{20} negative charges at basically solid densities. Something we think we know about physics clearly is not right, and the utility of these objects to remotely trigger metastable exothermic actions has barely been explored."

McKubre recalled, "On his regular fundraising visits to the Bay Area, Ken would drop into my office and we would 'shoot the breeze,' typically about the state of science. I missed him on his last visit. I knew that his health was failing but somehow imagined that he would carry on forever." He lamented, "I miss him now but the world does not because, with very few exceptions, it has no idea what it is that Ken knew. More sadly still, I don't know of anyone who can replace him."

The paper "Charge Clusters in Action" and Shoulders' other writings are available at: <http://www.svn.net/krcsfc/Shoulders> also self-published *EV: A Tale of Discovery* in 1987.