

Dr. TIHIRO OHKAWA's Memorial

Contribution from Charles C. Baker

I first met Tihiro Ohkawa in early 1972 while I was a graduate student at the University of Wisconsin (UW). I was nearing the end of my Ph.D. research project. I had written to Mr. Art Shoop, who was a member of the Fusion Division at General Atomics, inquiring about employment opportunities, but had not heard anything. Then one day I got a call in my lab in Madison that Dr. Ohkawa was at the UW Physics Department, visiting Prof. Don Kerst, a colleague of his from earlier GA days. He wanted to see me. So I headed over to see Dr. Ohkawa, wearing only some old lab cloths. Needless so say, I was rather nervous. He introduced himself and we began talking about my research that concerned the experimental study of a crossed-field plasma accelerator. He asked many penetrating questions – a characteristic of Tihiro that I would come to know very well. I was not sure how well the interview went, but a few weeks later I got an offer of a position in GA's Fusion Division. And my family and I were on our way to San Diego.

When I reported for work at GA that summer, I was directed to Dr. Ohkawa's office, which in those days was not too large. He was having a meeting of the entire scientific staff in his office – only about 15 physicists at that time. Under Tihiro's leadership, the fusion effort at GA then underwent a substantial growth over a very short time, growing to over 200 professionals in about two years.

I was assigned to a small group (4 people) headed by Dr. John Gilleland. This group was doing conceptual design and preliminary work on a proposal for a new large experiment called Doublet III (DIII). DIII was to be the critical test of the Doublet concept invented by Dr. Ohkawa. Its aim was to substantially improve the performance of the Tokamak magnetic plasma confinement approach to fusion energy. It is remarkable the Dr. Ohkawa was able to convince the US Government and many in the US fusion community to undertake such an ambitious project.

Shortly thereafter, Tihiro sent Art and me to the Princeton Plasma Physics Laboratory to meet with Dr. Don Grove, then leading the design and construction of a new, large Tokamak called PLT. For the first time, I saw the effort it takes to design and construct a large, complex fusion device. I think this was one of the purposes that Tihiro had in sending a new, inexperienced engineer along with Art, a long time and key member of GA's fusion group.

Within a few months of arriving at GA, Tihiro asked me to head up a small engineering group, whose focus was on supporting the conversion of the Doublet II experiment to the Doublet IIA device. I had no previous experience in such activities. I think Tihiro was a strong believer in the old adage that the best way to teach someone to swim, was to

simply throw him into the pool! I watched him do this many times. He had an uncanny ability to see the potential in young people.

In 1974 the US was considering building a new, large Tokamak device that would actually burn deuterium (D) and tritium (T), producing fusion energy at near breakeven conditions. Dr. Robert Hirsch, then head of the fusion program in Washington, called Tihiro one day and wanted GA to carry out a small study looking at such a device. Tihiro called me into his office and said he wanted me to lead the study. I said I had no experience in such a study so why me? He answered that it involved nuclear engineering and I was the only nuclear engineer on his staff. So the study was done. Later that year there was a major meeting in Washington to evaluate the readiness to proceed with a DT device (which would soon be named the TFTR – Tokamak Fusion Test Reactor). Tihiro had me make a presentation at the meeting summarizing the results of our study; a minor part of the meeting but the first time I was on the national stage. One more example of Tihiro developing young people.

In those days, the Electric Power Research Institute (EPRI - the research arm of the electric power industry) funded some of the plasma physics research at GA, e.g. studies on the dc Octopole. Washington was planning on carrying out some studies of the next step toward fusion energy after TFTR. This step was called in those days an Experimental Power Reactor (EPR). Washington and EPRI worked out a deal that Washington would purchase a new motor-generator for DIIA (to replace submarine batteries lost in a fire) and EPRI would fund a major, 2-year study at GA of an EPR based on the Doublet concept. This would be one of the first such studies done in the US and the first at GA. To do this work, Tihiro decided to form a Fusion Engineering Department in the Fusion Division, the first such step at GA. He asked me to head this new department, which included groups working on fusion reactor physics, reactor engineering, materials research, and special advanced projects. Thus Tihiro was extending the scope of the Fusion Division from plasma physics (the origin of its strength) to all other areas related to developing fusion energy.

Tihiro Ohkawa developed the GA fusion program into a world-class enterprise. He did this through foresight, dedication and the ability to see potential in young people. I am indebted to him for giving a young, inexperienced engineer many opportunities for growth and professional advancement.

Even with all his programmatic and administrative burdens, Tihiro always found time to do some physics. My lasting impression of Tihiro is walking into his office late in the day (a common occurrence for me) and seeing him sitting at his desk, feet up on the desk, glasses pushed up on his head, a pencil and paper in hand, doing what he most loved to do – physics.

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