

became professor of metallurgy at the University of Illinois and held that position until his retirement in 1976. Even after retirement, he continued his research in alloys and published into the late 1980s.

Research on recrystallization, grain growth and textures in deformed metals and alloys occupied a major period of his life, from the late 1920s into the 1960s. His work had a large impact on the industrial processing of alloys, especially in the high-strength, low-alloy steels and later in materials for nuclear reactors. Although many refinements naturally ensued, the fundamental principles from Paul's work still are important.

From the time he arrived in Illinois, Paul's latent interest in the electronic nature of metallic alloys blossomed, partly as a result of his association with theorists and low-temperature scientists in the physics department. He developed a strong effort in measuring the density of states at the Fermi level of alloys in the 3-d series using the low-temperature specific heat as a tool. He and several students painstakingly measured the specific heats of closely spaced solid solution alloys (atom-by-atom solutes—not compounds) across the 3-d series. The result of their work showed great spikiness of the density of states—I recall that reviewers of his papers could scarcely believe the rapid variation with electron-to-atom ratio. But, I recall also that the spikiness was if anything understated by the work.

Paul accompanied this work with research on the structure and properties of compounds. Part of this research involved precipitated phases that cause troublesome embrittlement in specific transition-metal alloys and part involved their magnetic character. Eventually, Paul switched his work over, nearly completely, to the low-temperature magnetic character of alloys—and that was the research that occupied the last 20 years of his career. He measured the spin-glass nature of alloys, a property that he called micromagnetism. His last research concerned the magnetic character of ultrathin layers of iron in gold.

Few other engineer-scientists in my memory so easily spanned the field between metallurgy and solid state physics. Paul was in regular communication with the best researchers and teachers in both groups. His 175 publications were partly in materials science journals and partly in those of the American Institute of Physics. As a result, he received numerous honors from both physical and metallurgical societies. He was a member of the National Academy of Engineering.

Paul's many graduate students, postdocs and colleagues will recall all their lives the intensity of his desire to understand the nature of metallic alloys and compounds.

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Shang Yi Ch'en

Shang Yi Ch'en, a professor emeritus of physics at the University of Oregon, died on 23 February 1997 after a long illness. He had achieved a distinguished career in optical spectroscopy.

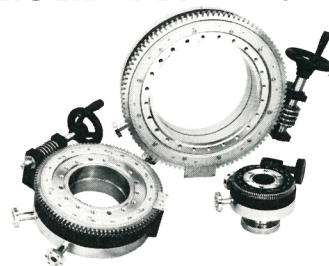
Ch'en—"George" to his friends—was born in Hopei, China, on 4 March 1910. He earned a BS and MS in physics from Yenching University in Beijing in 1932 and 1934, respectively. He then became a research assistant at the National Academy of Beijing's Institute of Physics, where he measured the pressure broadening of spectral lines, a subject that was to become central to his entire research career. Under a fellowship from the China Foundation, he entered Caltech and in two years completed his PhD thesis on the broadening of rubidium resonance lines, under the supervision of Ira S. Bowen. Ch'en returned to Yenching University in 1939 and established a spectroscopy laboratory there. In 1942, when the university was closed by Japanese occupation forces, Ch'en and his family made their way to Chengtu, deep in China's southwestern interior.

In 1949, Ch'en moved to the US and joined the physics faculty of the University of Oregon, where he taught until his retirement in 1975. With his students, he conducted an active research program, studying collision-induced absorption and emission of atoms and line shifts in the presence of foreign gases. Among his most widely known work is a survey of the field, "Broadening and Shift of Spectral Lines Due to the Presence of Foreign Gases," written with Makoto Takeo and published in the *Reviews of Modern Physics* (29, 20, 1957). In the 1970s, he served as an associate editor of the *Journal of Quantitative Spectroscopy and Radiative Transfer*.

Shang Yi Ch'en was a productive and resourceful scholar, influential mentor, and thoughtful adviser. He will be missed very much by his colleagues, friends and former students.

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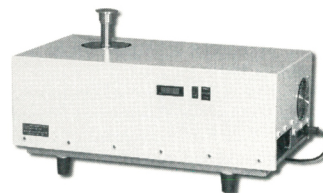
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