MEMORIAL RESOLUTION OF THE FACULTY OF THE UNIVERSITY OF WISCONSIN-MADISON ON THE DEATH OF PROFESSOR EMERITUS KEITH R. SYMON

Keith R. Symon, Emeritus Professor of Physics, died December 16, 2013, in Spring Green, WI at the age of 93. He was born in Fort Wayne, IND on March 25, 1920, and received the BSc (1942), MA (1943), and PhD (1948) degrees from Harvard. His studies were interrupted by service as an Ensign, U.S. Navy, at the Naval Research Laboratory (1943-1946). He taught at Wayne State University 1947-1955, rising from Instructor to Associate Professor. He moved to UW-Madison as Assistant Professor in 1955, promoted to Associate Professor in 1956 and to Professor in 1957. He became Emeritus Professor in 1989. He played leading roles in the MURA (Midwestern Universities Research Association) accelerator design project and the creation of the plasma physics program at UW-Madison. He served as Technical Director of MURA 1957-1960 and Chair of the Argonne Accelerator Users Group 1961-1962. His external awards include the IEEE Particle Accelerator Science and Technology Award (2003) and the APS Robert R. Wilson Prize (2005) for Achievement in the Physics of Particle Accelerators. He was a Fellow of the AAAS and of the APS.

The MURA period of the 1950s and early 1960s is remembered as a "Golden Era." It was a time when the field of accelerator physics became a well-defined active collaboration of theoretical and experimental physicists, as was illustrated by Keith's extremely fruitful partnership with Professor Donald Kerst. Keith made major contributions to the understanding of the principles of high energy particle accelerators and was instrumental in leading the evolution of the design process from empirical explorations to theoretical analysis and predictions of performance and stability. He held the patent for the Fixed Field Alternating Gradient particle accelerator that greatly improved the control of focusing in accelerators. With A. M. Sessler, he showed how to use radio frequency phase manipulation to accelerate particles while preserving a previously "stacked" beam and thus to build intense beams. This was essential to the success of the Intersecting Storage Rings and all subsequent hadron colliders. Symon and Sessler also advanced the theory for colliding beam machines and coherent instabilities of the beams and established the long-time behavior of these nonlinear dynamical systems. In the 1960s Keith's interests evolved from accelerator physics into the emerging field of plasma physics. The Symon and Kerst partnership, theorist and experimentalist, continued as they initiated the plasma physics program at UW-Madison. The plasma effort that they began has grown into one of the world's premier university programs in plasma physics and fusion energy. Keith brought to plasma physics the mathematical rigor and physical insight gleaned from his pioneering work in accelerator physics. Keith developed the theory of plasma equilibria and stability and obtained analytic solutions that were critical in the days before the prevalence of high-speed computers. He introduced new ways of conceptualizing particle behavior in plasmas through phase space interpretations based on the Liouville equation, an approach that he exploited previously for accelerators. As plasma physicists struggled with understanding the

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complex behavior of plasmas, Keith invariably penetrated through the complexity with his fundamental approach to physics, to the benefit of plasma physicists at UW and around the US. He was a pioneer in the computer simulation of plasmas. The standard he set and the physics that he contributed have set the course for plasma physics at UW for years to come.

Keith's service to the university was numerous and varied, as he repeatedly was called upon during emergencies. He transitioned from a period as Acting Director of the Madison Academic Computing Center (MACC) 1982- 1983 (predecessor to DoIT) to being Acting Director of the Synchrotron Radiation Center (SRC) 1983-1985. In 1984 the University established SRC, formerly a project at the Physical Sciences Laboratory, as an independent Graduate Center. This was a critical time for SRC and a difficult and challenging job for Keith. His knowledge of accelerator physics was invaluable in bringing the electron storage ring to an acceptable level of performance. He also was Chair of the Physics Department 1977-1979 and served two terms on the Physical Science Divisional Committee.

Keith was a fine teacher in the class-room, major professor to 15 Ph.D. students, and a valued colleague. His textbook "Mechanics," was first published in 1953; its third edition is still in print and continues to be used in advanced undergraduate courses world-wide.

He was predeceased in 2009 by his wife of 66 years, Mary Louise Symon. He is survived by his four children, Judith E. Symon Hanson, Keith J. Symon, James R. Symon, and Rowena L. Roske, 12 grandchildren, and 11 greatgrandchildren.

Memorial Resolution Committee:
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