

Biographical Encyclopedia of Astronomers

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Larmor, Joseph

Born Magheragall, Co. Antrim, (Northern Ireland), 11 July 1857

Died Holywood, Co. Down, Northern Ireland, 19 May 1942

Irish mathematician and theoretical physicist Joseph Larmor gave his name to the Larmor radius, frequency, and precession, which describe the motion of a charged particle in a magnetic field. He calculated these with special reference to the behavior of a low-mass, negatively charged particle called the electron, which he was the first to predict

Larmor was born to Hugh Larmor, a farmer, and Anna Wright Larmor. He was named after his maternal grandfather and was the eldest child of a large family. Hugh Larmor gave up farming when Joseph was around six or seven to become a grocer and moved the family to Belfast, where Joseph attended the Royal Belfast Academic Institution. Upon completion of his schooling at the Institution, Larmor entered Queen's College, Belfast, where he received his BA and MA. Upon graduation in 1877, he went to Saint John's College, Cambridge, to study for the mathematical *tripos* there. Larmor lost a year due to illness but returned with a vengeance. He was senior wrangler (first place in the *tripos* examinations) in 1880; second place that year was J. J. Thomson—and he won the Smith Prize.

Upon graduation, Larmor was appointed a fellow of Saint John's College and promptly returned to Ireland to become professor of natural philosophy at Queen's College, Galway. In 1884 he became a member of the London Mathematical Society, serving as a council member from 1887 to 1912, president in 1890 and 1891, and treasurer from 1892 to 1914. Larmor remained at Galway for five years before returning to Saint John's as a lecturer in 1885. He was elected a Fellow of the Royal Society in 1892 and served as its secretary from 1901 to 1912. In 1898, a lengthy compilation of three of Larmor's papers, later published as *Æther and Matter*, won the Adams Prize at Cambridge. In 1903, with the death of Sir George Stokes, he was appointed the Lucasian Professor of Mathematics at Cambridge, a post once held by Isaac Newton and currently held by Stephen Hawking.

In 1909, Larmor was knighted and served as a Member of Parliament for the University of Cambridge from 1911 to 1922. He made his first speech in 1912 defending the Unionists in a debate on Irish home rule, though his primary focus in Parliament was to support universities and education in general. Irrespective of the side Larmor took in the Irish debate, he always held the Emerald Isle dear to his heart, and he usually spent part of his long vacation there each year.

In 1915, the Royal Society awarded Larmor the Royal Medal, and then in 1921 the Copley Medal. He served on the council of Saint John's College for many years

Larmor retired from the Lucasian chair in 1932, to be succeeded by Paul Dirac, but remained in Cambridge for another year or two before returning to Ireland, retiring at Holywood, County

Down, near Belfast, his health deteriorating. Except for one brief return visit to Cambridge, he remained in Ireland. Larmor held a bachelor's degree throughout his life.

Larmor's most significant contribution was the publication of his opus, *Æther and Matter*, in 1900. The work was actually a compilation, with slight revisions, of three important papers he wrote between 1894 and 1897 and published in the *Philosophical Transactions of the Royal Society* on the theory of the electron—the first such prediction of the particle. The work gained support when J. J. Thomson actually discovered the electron in 1897

This, as with nearly all of his work, was built upon Larmor's very first paper that dealt with the Principle of Least Action. Arthur Eddington viewed his enthusiasm for this principle as nearly mystical. Larmor's refusal to accept general relativity only waned when he began to see it in terms of the principle of least action.

Aether and Matter brought to a resounding end the plethora of material and mechanical models of the ether. But it did contain the bulk of Larmor's work on the development of the electron. It also contained experimental facts regarding the Lorentz transformation, and at times some authors have suggested the name be changed to the Larmor-Lorentz transformation. As we know, relativity sprang from this transformation, which is ironic considering Larmor's long disbelief in relativity

In 1897, Larmor showed that the motion of ions in a molecule under the influence of a magnetic field was equivalent to the rotation of the group with an angular velocity about the axis of the field. This effect is now known as Larmor precession.

Larmor also contributed some direct astronomical and geophysical papers. Some of these topics included the correction of the period of Eulerian nutation for the elasticity of the Earth, a correction for the fluidity of the ocean, a study of the problem of the variation of latitude, a study of the electrical conductivity in the upper atmosphere, and an analysis of sunspot frequencies.

Ian T. Durham

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