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Surface electromagnetic waves: Past, present, future

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Surface electromagnetic waves (SEW) have been known for 200 years. Currently, they are widely used in optical and investigated at THz frequencies in the area which form the basis of the current status and future development of nanotechnologies (plasmonics). The history of the research of electromagnetic waves that are different in nature from spatial Maxwell-Hertz electromagnetic waves and emerging on the boundary of two media with different dielectric properties, developed from universal acceptance in the early 20th century the concept of SEW Sommerfeld-Zenneck, until her categorical denial by middle-century, the revival of interest in 60-years and experimental confirmation by the beginning of the 21st century. In Russia, the theory of SEW developed intensively, and experimental proof of the existence of SEW was

given: waves of ultrahigh frequencies detected and investigated in the laboratory in the magnetized semiconductors, on salt (w. h. Ocean) water, gas plasma and metals; were observed in vivo. SEW exist at frequencies up to optical. To date, they are best explored in the ultra high frequency range and optics (plasmon-polaritons). Extended field studies in the field of high, low and Ultralow frequencies holds exciting prospects: (OTH) radar, new channels of global telecommunications, monitoring the surface of oceans, weather management, wireless transfer of energy flows on the surface of Earth and the bottom edge of the ionosphere from continent to continent. SEW have dramatic past, pragmatic present and a great future.

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