Riemannian and pseudo-Riemannian nearly Kähler spaces

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An almost complex (pseudo-)Riemannian manifold is Kähler if its almost complex structure is parallel with respect to the Levi-Civita connection. Nearly Kähler manifolds are defined by the weaker condition that the derivative of the almost complex structure with respect to the Levi-Civita connection is skew-symmetric. The first example of a non-Kähler nearly Kähler space is known since the 1940ties, their systematic study was initiated in 1970 and they play an important role in contemporary differential geometry, for example in the theory of calibrations and special holonomies. In this lecture, we will talk about homogeneous nearly Kähler manifolds in dimension 6, the lowest dimension in which non-Kähler examples can occur, their curvature and their submanifolds.