1056-53-562 **M dunajski***, DAMTP, Wilberforce Road, m.dunajski@damtp.cam.ac.uk, Cambridge, England.
Four-dimensional metrics conformal to Kahler.

I shall discuss my recent work with Paul Tod and give some necessary and sufficient conditions on a Riemannian metric (M, g) in four dimensions for it to be locally conformal to Kähler. If the conformal curvature is non anti–self–dual, the self–dual Weyl spinor must be of algebraic type D and satisfy a simple first order conformally invariant condition which is sufficient and necessary for the existence of a Kähler metric in the conformal class. In the anti–self–dual case we establish a one to one correspondence between Kähler metrics in the conformal class and non–zero parallel sections of a certain connection on a natural rank ten vector bundle over M. We use this characterisation to provide examples of ASD metrics which are not conformal to Kähler. We establish a link between the 'conformal to Kähler condition' in dimension four and the metrisability of projective structures in dimension two. A projective structure on a surface U is metrisable if and only if the induced (2, 2) conformal structure on $M = TU$ admits a Kähler metric or a para-Kähler metric. (Received September 12, 2009)