Undesirable entry (very short simple) **example:**

KÄHLER MANIFOLD, a complex manifold which admits a Kähler metric [1].

BIBLIOGRAPHY. [1] E.Kähler Abh. Math. Semin. Univ. Hamburg 9(1933)173.

Desirable entry (very short simple) **example:**

KÄHLER MANIFOLD – A complex manifold K having $U(N)$ holonomy admitting a Hermitian metric $g_{i\bar{j}}$ (called a Kähler metric and can be written in complex coordinates z_i through the Kähler potential φ as $g_{i\bar{j}} = \frac{\partial^2 \varphi}{\partial z^i \partial \bar{z}^j}$) for which the fundamental form $\Omega = g_{i\bar{j}} dz_i \wedge d\bar{z}^j$ is closed $d\Omega = 0$ [1]. Examples: any one-dimensional complex manifold, complex N-space, a projective manifold CP_N and any its submanifold are Kähler manifolds. The only nonvanishing Christoffel symbol of a Kähler manifold is $\Gamma^k_{ij} = g^{k\bar{k}} \partial g_{i\bar{k}} / \partial z^j$ and the only nonvanishing component of the curvature tensor is

$$R^l_{ij\bar{k}} = -\partial \Gamma^l_{ij} / \partial \bar{z}^j \qquad (1)$$

The theorem of Calabi-Yau: Kähler manifold of vanishing first Chern class $c_1(K) = 0$ admits a Kähler metric of $SU(N)$ holonomy. Such Kähler manifold is Ricci flat $R_{ij} = 0$ and admits nonvanishing covariantly constant spinor $D_i \varepsilon = 0$ which allows to exploit 6-dimensional Kähler manifold K_6 in superstring phenomenology [2] based on compactification scheme $M_{10} \to M_4 \times K_6$, where M_4 is 4D maximally symmetric (de Sitter, anti-de Sitter or Minkowski) manifold [3].

BIBLIOGRAPHY. [1] A. Weil, Introduction to the theory of Kähler manifolds, NY 1957.

[2] M. Kaku Introduction to superstrings and M-Theory, Berlin 1999; M. B. Green, J. H. Schwarz, and E. Witten, Superstring Theory, Vols. **1,2**, Cambridge Univ. Press, Cambridge 1987.

[3] P. Candelas et al. Nucl.Phys. **B258** (1985) 46.