SEIBERG–WITTEN EQUATIONS AND ABRIKOSOV STRINGS

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Abrikosov strings arise in some superconductors when the level of the external magnetic field exceeds a certain critical value. Then the superconductivity starts to break down by forming normal conductivity zones inside the superconductor, looking like strings stretched along the direction of the field. This physical model is described by the Ginzburg–Landau equations. Their 2-dimensional reduction leads to the vortex equations on the complex plane, which are closely related to the non-linear Liouville equation. The considered physical model has also a non-trivial mathematical 4-dimensional analogue — the Seiberg–Witten equations on a symplectic manifold. Natural analogues of the Abrikosov strings in this case are given by pseudoholomorphic curves. Moreover, a reduction of Seiberg–Witten equations to such complex Abrikosov strings can be defined, leading to systems of vortex equations on their normal bundles.