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Thermodynamics of micropolar Bingham fluids

V.V. Shelukhin, V.V. Neverov

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Highlights

- Equations of micropolar fluids are generalized to allow for yield stresses. There are two yield stresses related to the Cauchy stress tensor and to the couple stress tensor; the first is not symmetric one.
- The equations derived take into account variable concentration of polar particles.
- Conservation laws and constitutive equations agree with basic thermodynamic principles.
- Among the constitutive equations is the generalized Fick law stating that the concentration flux can depend on micro-rotation.
- Starting from the steady flow equations, we confirm the Segre-Silberberg effect.

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