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Sommario/riassunto	The present work addresses the design of structure-preserving numerical methods that emanate from the general equation for non-equilibrium reversible-irreversible coupling (GENERIC) formalism. Novel energy-momentum (EM) consistent time-stepping schemes in the realm of molecular dynamics are proposed. Moreover, the GENERIC-based structure-preserving numerical methods are extended to the context of large-strain thermoelasticity and thermo-viscoelasticity.