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Nota di contenuto	Introduction -- The physics of dispersed turbulent two-phase flows -- Reduced statistical descriptions and the probabilistic framework -- Statistical modeling of particle transport in turbulent flows -- Modeling the velocity of the fluid seen current formulations -- Modeling the velocity of the fluid seen new propositions -- Similarities and differences with complex fluids -- Fast variable elimination and local constitutive relations -- tatistical modeling of particle collisions in turbulent flows -- Conclusions and perspectives on the roads ahead.
Sommario/riassunto	This open access book provides a thorough introduction to modeling turbulent, dispersed, two-phase flows. It explains the physical phenomena and governing laws at play, followed by a clear and systematic overview of the statistical tools used to develop simplified or coarse-grained models. With a pedagogical approach, the book uses practical examples to explain complex physical processes and stochastic methods, making it accessible to readers familiar with basic courses in statistical physics and applied mathematics. It also highlights emerging research areas and unexplored challenges in the field. Designed as a self-contained resource, this book is ideal for

graduate students and junior researchers in various branches of physics. At the same time, it serves as a valuable reference for experts seeking deeper insights into turbulent, dispersed, two-phase flows.