4. SUPPORTING PARAGRAPH ENLARGING ON THE CITATION AND INDICATING THE ORIGINALITY AND SIGNFICIANCE OF THE CONTRIBUTIONS CITED

Milind Kunchur is the world leader in the exploration of superconductors under extreme conditions of electric fields (in kV/cm), power densities (in GW/cubic-cm), and vortex velocities (over 10 km/s). He was the first to show the applicability of the Bardeen-Stephen flux flow concept (1965) to high-temperature superconductors [1], a result that is cited in Michael Tinkham's "Introduction to Superconductivity" textbook. The elusive pair-breaking current, one of the three fundamental critical parameters of the superconducting state, was measured for the first time in any high-temperature superconductor by Kunchur [2], who went on to conduct the most complete test of theories on this topic. Kunchur discovered and provided the theory for a new type of vortex instability that arises from vortex core expansion and condensate softening at high vortex velocities [3]; an effect entirely unanticipated and fundamentally different from the conventional Larkin-Ovchinnikov instability in which the core contracts. Subsequently he conducted the most controlled investigation of the negative-differential conductivity regime, which led to the discovery of quantized steps in the current-voltage response (analogous to the Gunn effect in semiconductors) resulting from elastic fragmentation of the flux lattice [4]. During his 25-year research career, Kunchur has made significant contributions to several topics. His work in metal-insulator transitions was the first to show that the metal-insulator and super-normal transitions don't have to coincide [5], and he demonstrated a new method to establish the metallic character of the normal state at low temperatures [6]. He published one of the early papers on the Hall effect in high- temperature superconductors that elucidated the controversial sign reversal [7]. He proposed and experimentally confirmed a new memory effect that was key to ruling out the superconducting-glass scenario for magnetic relaxation in high-temperature superconductors. He was the first to demonstrate in a real-time correlated current-voltage measurement the ballistic acceleration of a supercurrent in an electric field [8], as expected from the first London equation. Recently Kunchur turned his expertise with fast pulsed signals to investigate a very different question—the time resolution of human hearing—and set the new standard of 5 microseconds. This revolutionary result is now being cited in college textbooks and discussed in popular magazines.