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A new mode and Cherenkov instability in pair plasma. ZAHIDA EHSAN, COMSATS Institute of Information Technology, Lahore 54000, Pakistan., NODAR TSINTSADZE, Faculty of Exact and Natural Sciences and Andronicashvili Institute of Physics, Javakhishvili Tbilisi University, Tbilisi 0128, Georgia, HASSAN SHAH, GC University Lahore 54000 Lahore, RAOUL TRINES, Central Laser Facility, STFC Rutherford Appleton Laboratory, Didcot OX11 0QX, United Kingdom — Positive and negative ions forming the so-called pair plasma differing in sign of their charge but asymmetric in mass and temperature support a new acoustic-like mode. The condition for the excitation of ion sound wave through electron beam induced Cherenkov instability is also investigated. This beam can generate a perturbation in the pair ion plasmas in the presence of electrons when there is number density, temperature, and mass difference in the two species of ions. Basic emphasis is on the focusing of ion sound waves, and we show how, in the area of localization of wave energy, the density of pair particles increases while electrons are pushed away from that region. Further, this localization of wave is dependent on the shape of the pulse. Considering the example of pancake and bullet shaped pulses, we find that only the former leads to compression of pair ions in the supersonic regime of the focusing region. Here, possible existence of regions where pure pair particles can exist may also be speculated which is not only useful from academic point of view but also to mimic the situation of plasma (electron positron asymmetric and symmetric) observed

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