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Manifestation of Negative Compressibility in Low-Density Electron Liquids: Anomaly in the Ion-Pair Distribution Function in Supercritical Fluid Rb YASUTAMI TAKADA, ISSP, Univ. of Tokyo — It is a well-known fact that the electronic compressibility κ diverges in the 3D electron gas as the density parameter r_s approaches 5.25. A recent investigation clarifies that this divergence is due to the excitonic effect in the electron-hole pair excitation, in particular, to its zero-energy excitation [1]. For $r_s > 5.25$, κ becomes negative, leading to the negative static dielectric function $\varepsilon(q, 0)$ for at least small q owing to the compressibility sum rule. Then we can expect that two positive test charges do not repel but attract to each other in such a system. Keeping this situation in mind, we have calculated the ion-pair distribution function $g(R)$ in the expanded Rb liquid metal by using the Monte Carlo method and found interesting features in $g(R)$ characteristic to the negative $\varepsilon(q, 0)$ [2]. Such features have been observed by the recent measurement of $g(R)$ in the supercritical fluid Rb metal with continuously increasing r_s from 5.25 [3]. This confirms the situation of $\kappa < 0$ in the low-density 3D electron gas for the first time. [1] YT, J. Superconductivity **18**, No.3 (2005). [2] H. Maebashi and YT, to be submitted. [3] K. Matsuda and K. Tamura, private communication.

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