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Pluriharmonic Toeplitz Operators on the Fock Space

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For a series of weighted Bergman spaces H_h over bounded symmetric domains Ω in $\mathbb{C}^n$ and suitable algebras $\mathcal{A}$ of bounded operators on H_h containing all Toeplitz operators with bounded symbols it has been shown that compactness of $A \in \mathcal{A}$ can be characterized via the boundary vanishing condition of its Berezin transform. Such a result also is known in the unbounded setting of the Fock space $\mathcal{F}_h$ of all Gaussian square integrable entire functions on $\mathbb{C}^n$. In case of the pluriharmonic Bergman space H_{ph} over Ω the (pluriharmonic) Berezin transform B_{ph} of bounded bounded operators into the real analytic functions over Ω is not one-to-one in general and even has non-compact operators in its kernel. From this point of view perhaps surprisingly we show, that via B_{ph} the same characterization of compactness holds for Toeplitz operators on the pluriharmonic Fock space $\mathcal{F}_{\mathrm{ph}}$. We give some applications of this result to the operator theory on $\mathcal{F}_{\mathrm{h}}$ and $\mathcal{F}_{\mathrm{ph}}$.