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Multiplication operators on the Bergman space

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In joint work with S. Sun and D. Zheng we study the reducing subspace for multiplication operators on the Bergman space on the unit disc defined by a finite Blaschke product $B(z)$. This builds on earlier work by a number of researchers pursuing a question posed by K. Zhu. One shows the relation of the von Neumann algebra generated by projections onto reducing subspaces to the Riemann surface S_B defined by $B(z)$. In particular, we show that the dimension of this algebra is equal to the number of connected components of S_B and show if the number of zeros is eight or less that the algebra is commutative. These results provide a complete description in the latter cases but we leave unresolved the question of whether the algebra is commutative in general. The emphasis in this talk will be on a conceptual understanding of the structure revealed by our results rather than on the technical details.