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Patrick M Gilmer* (gilmer@math.lsu.edu). *Integrality for Morphisms induced by cobordisms in TQFTs*. Preliminary report.

Let K be a commutative ring with unit. Let $\text{Mod}(K)$ denote the category of finitely generated projective K -modules. Suppose K contains a Dedekind Domain D . A TQFT over K defines a functor F from a cobordism category C to $\text{Mod}(K)$. Let C' be the subcategory of C consisting of nonempty objects, and morphisms connected to their source. We give conditions under which F restricted to C' must factor through $\text{Mod}(D)$. This is applied to the WRT $\text{SO}(3)$ theory associated to an odd prime r , which is based on the Kauffman bracket where A is taken to be A_r , a primitive $2r$ -th root of unity. The objects of C are closed surfaces Σ equipped with a Lagrangian subspace of the first homology of Σ and perhaps some framed points colored with even integers less than $r - 2$. The morphisms are 3-manifold cobordisms between objects equipped with colored framed links and integer weights. We also consider a subcategory C_+ of C where we restrict the weights modulo two of each cobordism. Let $C'_+ = C' \cap C_+$. Using the integrality result of H. Murakami for closed manifolds, generalized to include links by Masbaum-Roberts, we show these TQFT's restricted to C'_+ can be factored through $\text{Mod}(Z[A_r])$. The modules associated to nonempty surfaces are free over $Z[A_r]$. (Received September 20, 2000)