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**A novel approach for determining level schemes from $\gamma$-ray coincidence data** G.A. DEMAND, P.E. GARRETT, K.L. GREEN, K.G. LEACH, A.A. PHILLIPS, M.A. SCHUMAKER, C.E. SVENSSON, J. WONG, University of Guelph, G.C. BALL, D. BANDYOPADHYAY, G. HACKMAN, A.C. MORTON, C.J. PEARSON, TRIUMF, R.A.E. AUSTIN, S. COLOSIMO, St Mary's University, J.L. WOOD, W.D. KULP, D. FURSE, N. BROWN, Georgia Tech, G.F. GRINYER, NSCL/MSU, S.W. YATES, University of Kentucky, D. CROSS, Simon Fraser University — Nuclear structure studies often rely on understanding trends amongst the excited states of large numbers of nuclei. Experiments performed using powerful $\gamma$-ray spectrometers, like GAMMASPHERE or the $8\pi$ array, can often reveal many hundreds of transitions in the nuclei of interest. As a result, the determination of level schemes and the precise calculation of the associated properties, such as transition branching ratios, can become a substantial obstacle to the rapid development and formulation of new ideas. Recent increases in computational power, while insufficient to solve the problem by brute force, make an algorithmic approach possible. We will present results of applying a new algorithm based on evolutionary computation to $\gamma$-ray coincidence data obtained from $\beta$-decay studies of $^{112}$Ag and $^{160}$Tm, using the $8\pi$ array at TRIUMF-ISAC, to demonstrate the usefulness of this approach for nuclear structure studies. Work supported in part by NSERC.

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