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ZHOU Jian hui,SUN Xin li,GAO Wei ran,et al.Numerical Simulation of the Diffraction Detonation Wave Based on the Modified SPH Method[J].,2009,(1):66-69.

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基于修正SPH方法的爆轰波绕射传播的数值模拟

《火炸药学报》[ISSN:1007-7812/CN:61-1310/TJ] 卷: 期数: 2009年第1期 页码: 66-69 栏目: 出版日期: 2009-02-28

Title: Numerical Simulation of the Diffraction Detonation Wave Based on the Modified SPH Method

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关键词: 爆炸物理学; 修正SPH方法; 爆轰波; 绕射传播; 数值模拟

Keywords: explosion physics; the modified SPH method; detonation wave; diffraction propagation; numerical simulation

分类号: TJ55；O382

DOI: -

文献标志码: A

摘要: 为研究内置金属球体的球壳装药在一点起爆情况下的非理想爆轰波的传播行为，基于修正的光滑粒子流体动力学（SPH）方法进行绕射爆轰波传播的数值模拟，并应用一种工程上简便的近似计算方法对该球壳装药模型的爆轰波传播时间进行计算。结果表明，数值模拟的特征爆轰时间与理论计算结果非常吻合，验证了修正SPH方法在爆炸数值模拟领域的可行性。

Abstract: To investigate the non ideal propagation of detonation waves in the spherical shell of the charge containing a metal spherical body, based on the modified SPH method, a simulation of detonation waves′ propagation is figured out, and a simple engineering approximate calculation method is given to compute the propagation time of waves in the metallic spherical shell of charge. The results show that the characteristic detonation time obtained by simulation is consistent greatly with that obtained by theory analysis, indicating the modified SPH method is feasible and rational for explosion numerical simulation.

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ZHENG Xian xu,WANG Rong bo,TAN Duo wang,et al.Hot Spot Effect of Local Defects in Shocked Sapphire Crystal [J].,2009,(1):12.

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更新日期/Last Update: 2010-01-26